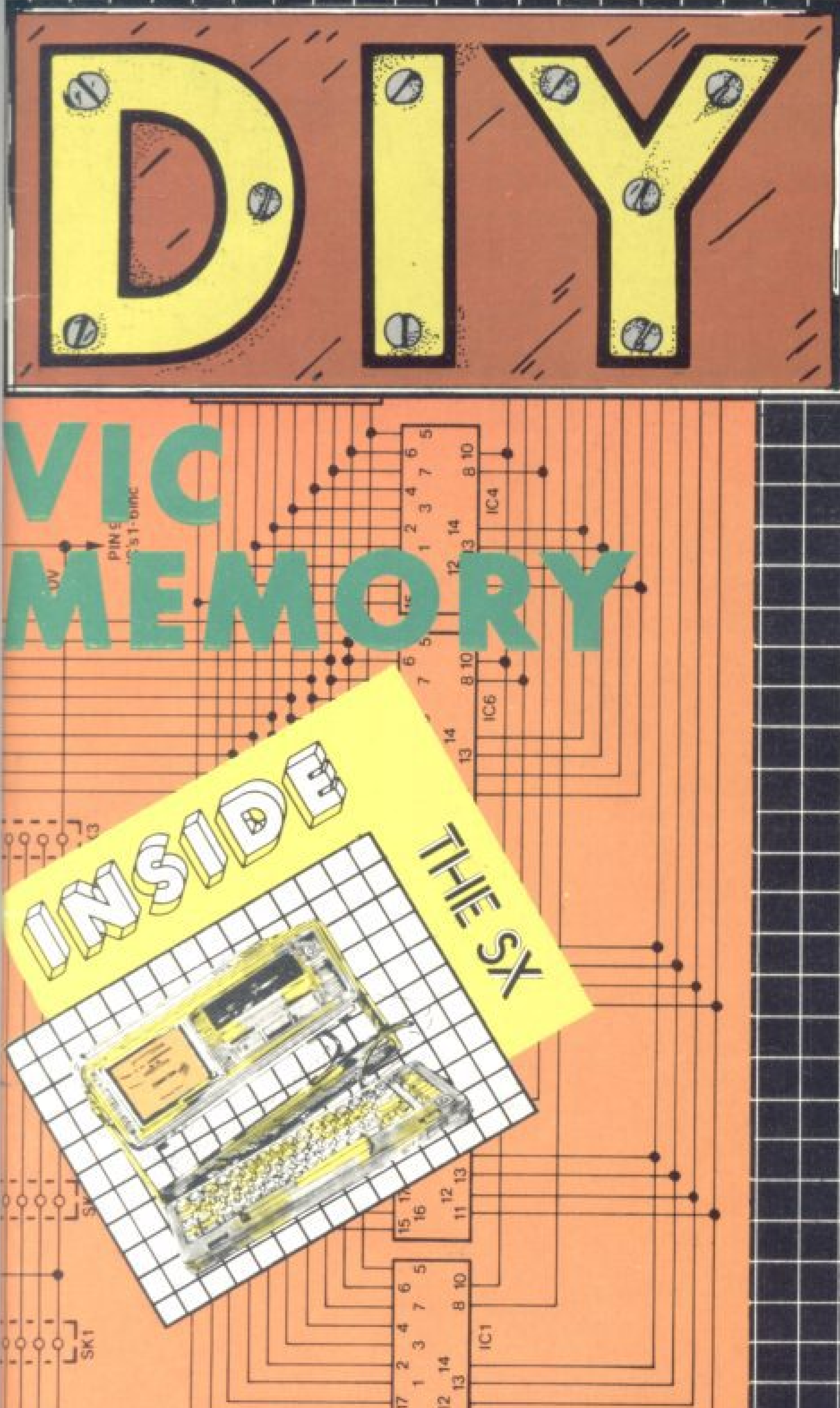
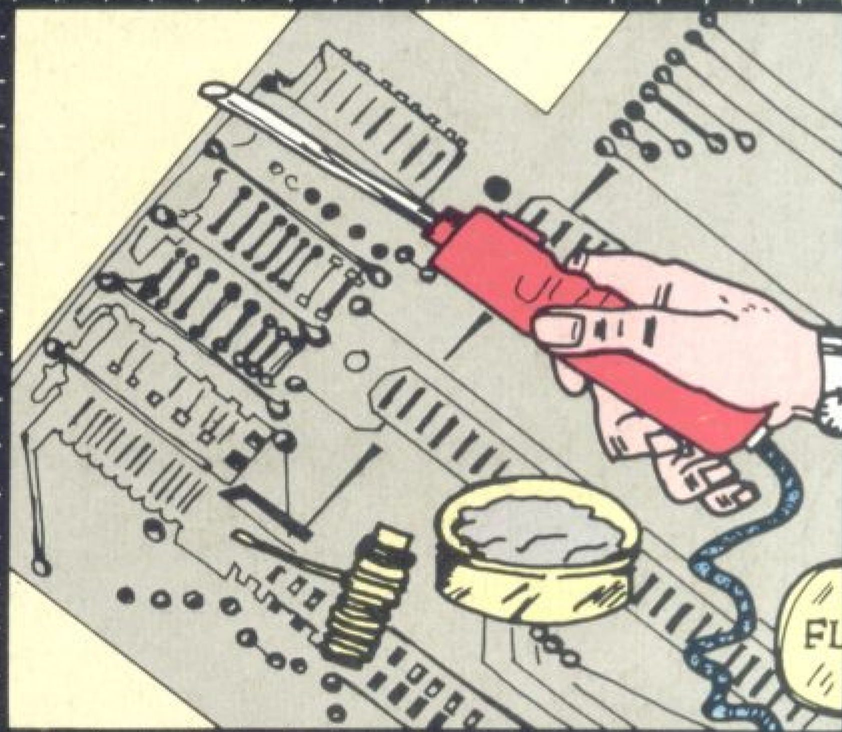
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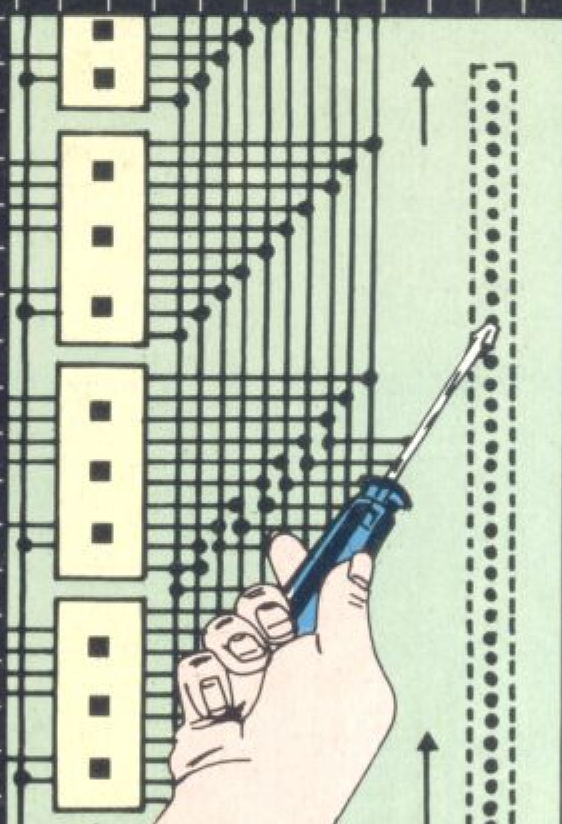
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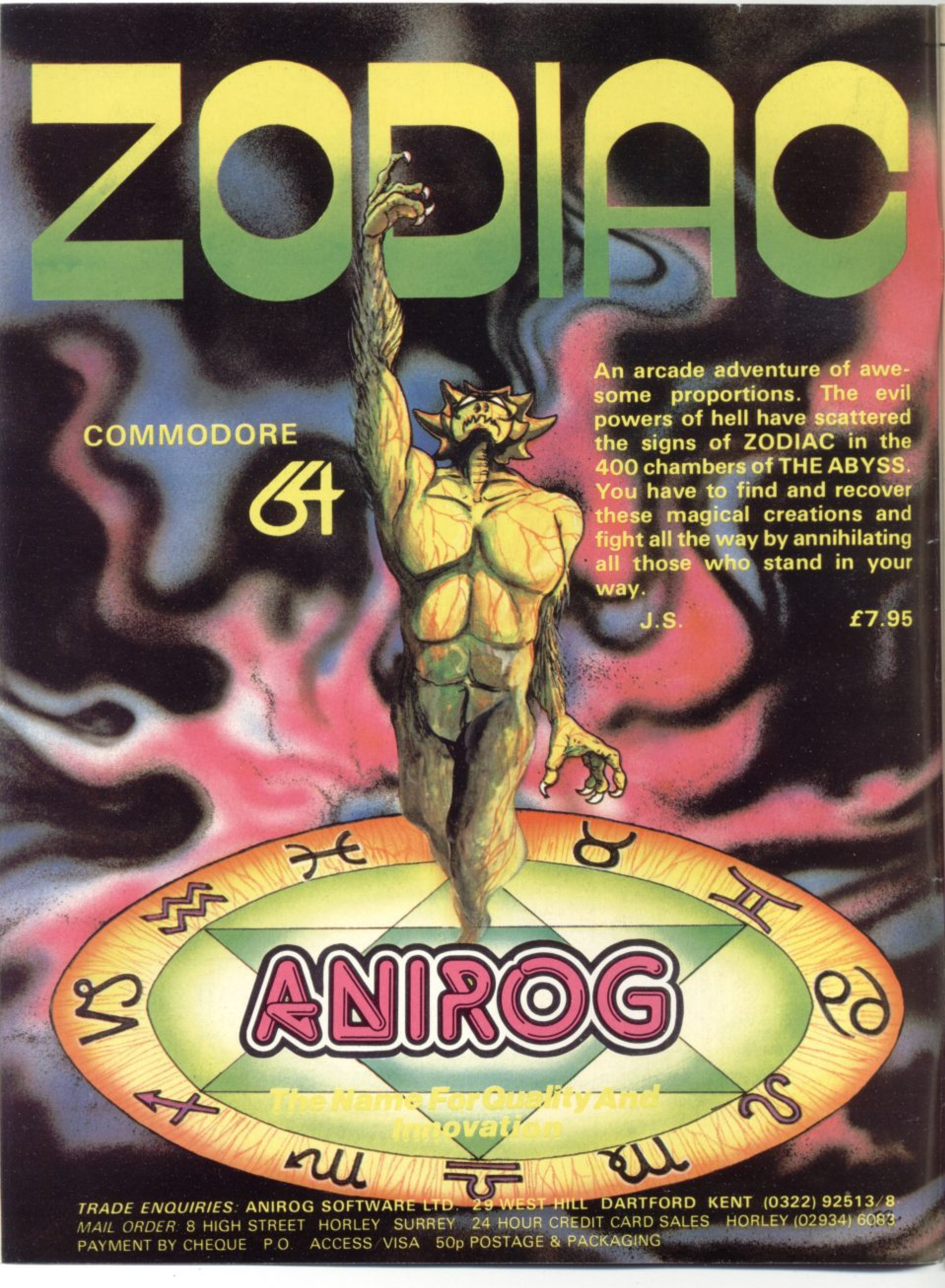
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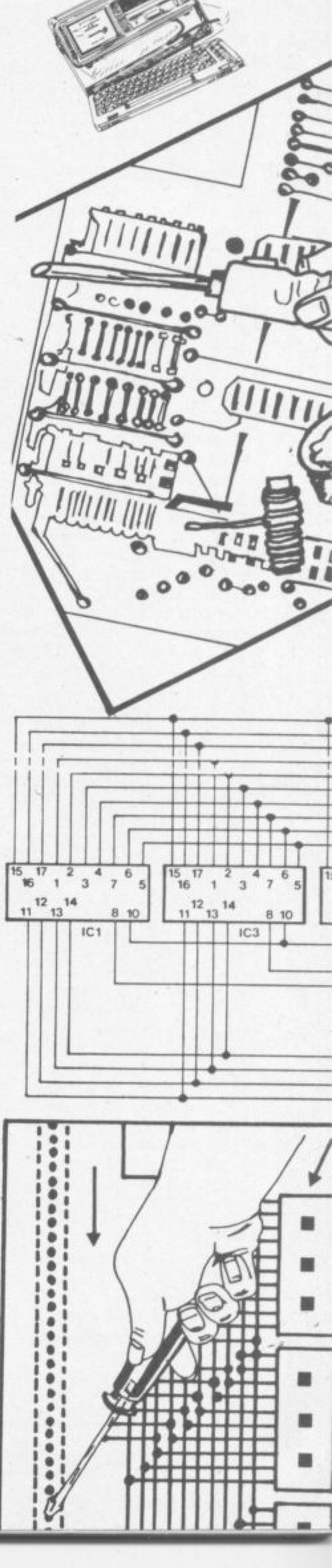
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COMMODORE SHOW PREVIEW

Reviews: Multiplan, VicGraf, Vic Forth


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Publisher's guarantee: There are no mistakes in this magazine except this one.

News

Hanover 1984 –

The annual Hanover Fair is a spring megashow that brings together all kinds of technical exhibitors from makers of earth-movers to LSI chips. It includes CeBit, an enormous computer hardware, software and peripherals exhibition that spans three of the 16 or so vast hangar-like halls which accommodate the show. Karl Dallas flew in for a look at Commodore's curtain-raiser of some of their current new ideas, and flew straight back to catch our press time with a definite impression that Commodore was trying the scattergun approach. Or to use a different metaphor, was it a case of running half a dozen flags up the pole to see which one got the most salutes – an exercise in primitive market research, in fact?

It is unlikely that the new 16-bit Commodore PC, a licensed copy of Bytec's IBM look-alike, the Hyperion, though with some significant changes, will be launched in Europe until "early 1985", and it will be held back from the American market until even later. Though he may be generally close-mouthed about the exact scheduling of the new generation of Commodores (see the Commodore Show Preview elsewhere in this issue), Commodore International President Marshall F. Smith did concede that one nugget of information at a Hanover Fair press reception early in April.

Smith forecast a similar schedule for the launch of Commodore's big surprise of the show, the unexpected new Z8000-based machine. Described as "a multi-user system with 16-bit architecture at an elevated level", it wasn't actually on display. Initially, it's expected that the standard form of the Z8000 (they kept the name) will be a two-terminal format, though it's planned that this will later be extended to eight or more terminals.

He would not be drawn on any prices. His German general distribution manager, Alwin Stumpf, did promise that "This top product will, of course, be offered with the same price/performance ratio people are used to with Commodore" – suggesting it would be very competitive.

In the show itself, however, the visitors to the Fair were gathering round the ranks of the new C16. This is a 16K Vic-sized machine, basically a cut-down 64 (we think). It could indeed be the long-awaited replacement for the 3.5K old faithful, though no one was admitting anything.

There were also plenty of 264s around – that's one of the two new machines with 60K user RAM expected to be launched on the UK market at the June Commodore Show. There was no sign of the other one, the 364 (it has built-in software and voice synthesiser); nor of the C116, an A5-sized version of the C16 with Spectrum-style rubber chicklet keys. Funnily enough the C116 was the only new machine which had been given a definite price tag – DM350 (about £90).

The German press release for the 264 spoke of it having integrated software as an option (probably the reportedly iffy Magic Desk) and also said it would not have any sprite-defining capability like the 64. Sounds like a business computer, right? The British spec for the 264 says: "Its 121 colours, sound and graphics make it an excellent games machine. From arcade style 'shoot-em-up' games to classic board games and business simulation, the 264 puts you in command." Oh well.

Instead of the VIC chip however the 264 has the TED – it stands for Text Display Processing. Which again suggests a concentration upon text and business applications, though more colours will be available.

The 116 and 264 both have Basic 3.5, as will the 364. This is like a standard Basic 2.0 with all the Toolkit and Super Expander commands built in, plus a slightly simpler disk operating system; it's still not up to the standard of Basic 4's DLOAD and DSAVE commands without device numbers.

The unexpected rush of publicity had obviously caught CBM's German PR people somewhat on the hop, because there were some definite funnies in the press kits given to us. Notably the release about the 116, which said quite decisively "The cursor will now be controlled by the 'joystick' method – advantage: an end with the complicated search for the keys" (sic). But the picture of the 116 we were given had the four new arrow-shaped cursor control keys in a simple N-S-E-W configuration (rather like the neat little NEC lap-held computer, and also found on the 264 and 364).

Anyone who wanted to test the IBM-compatibility of the new PC could have done it easily; there were plenty of Hyperions with CBM badges on them for people to try – even if the lash-up nature of the outfit was betrayed when you looked at the way that the Centronics output sockets had plugged into them hastily-assembled circuit boards to drive associated colour monitors.

According to Commodore's Director of Advanced Research and Development, Shiraz M. Shivji (a technological whizz-kid who was actually educated at Southampton) the Commodore PC when it comes on to the market will be rather more than merely a badge-engineered Hyperion. "The Hyperion was specifically tailored towards the telecommunications market and it was *somewhat* compatible with the IBM. We have made it more compatible," he told us.

"All the differences that are fairly significant have been removed. We have replaced the CRT controller with the same 6845 there is in the IBM. We have completely rewritten the BIOS, and there are considerable hardware changes as well."

Given the strength of the rather over-priced and clumsily-designed IBM machine in the market, and the amount of software specially written for it, it probably made sense for Commodore to do a look-alike. Why had he chosen the Hyperion, though (compared with, say, the Compaq, generally acknowledged to be superior)?

"The Compaq is a very fine machine," he agreed. "But it is over-designed for the market we are approaching. With the modifications we have suggested, the Hyperion is more appropriate."

The taciturn Mr Smith did rather put the cat among the PC pigeons when he stonewalled a question that suggested no contract had yet been signed with Bytec, Hyperion's original designers.

"I have no comment to make on the licensing or contract situation," he said.

The now ousted Commodore boss, Jack Tramiel, once advised his European marketing salesmen that the thrust of his company's marketing was to be almost exclusively directed at the small home user. Developments like the 16 and the 116 certainly



Pressekonferenz, Hannover 6. April 1984

Commodore flies some 1985 kites?



suggest that the company still has a lot up its sleeve in that direction. But the majority of the new machines it was showing, even if some of them were kite-flying of the most obvious nature, were actually *business* machines – and quite powerful business machines at that. In addition to the PC, there was the 128K 8296; and we also saw a version of the 8096 with integral disk drives, the 8096-D, which I gather may be seen on the UK market before the end of the year. These will no longer be the specially-designed drives originally intended for the 700; instead they're more or less standard 8250 drives, which will of course be (almost) compatible with the 8050s still around.

(incidentally, there is now an emulator program which makes the 700 perform as if it's an 8032; so the current special-package deals on 700s are all the more attractive.)

And then, at the top of the tree, comes the Z8000 series, which puts the company firmly in what Commodore is calling the micro mainframe market.

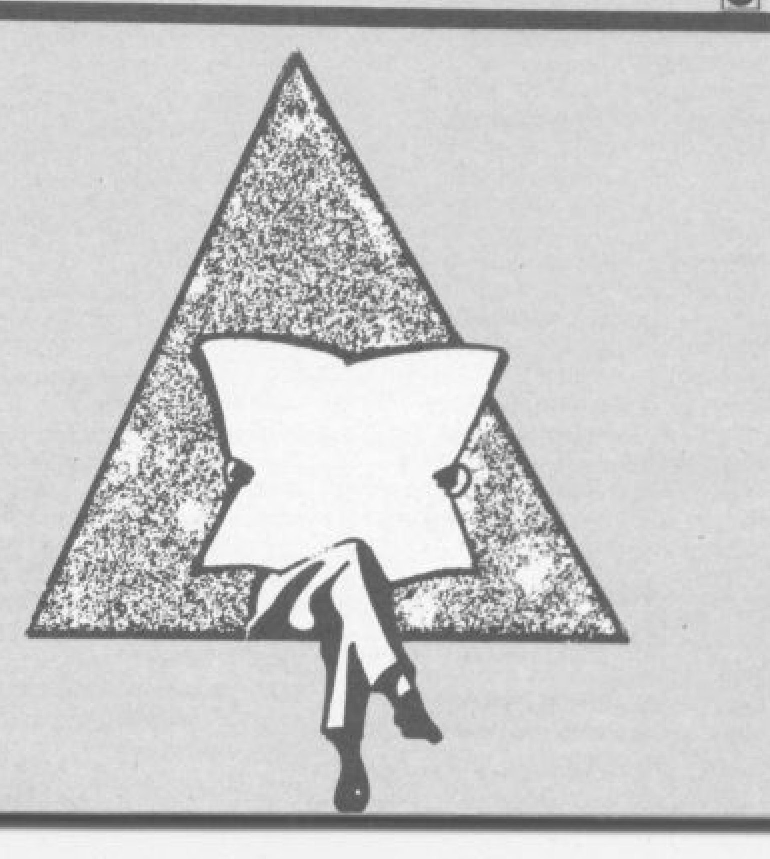
The new machines will start with 256K RAM, 32K ROM plus 128K screen RAM, Basic plus optional Pilot, Assembler, C compiler, monochrome screen with 1024 x 1024 resolution, the Unix 7 operating system (adapted under the name COHOS), IEEE/84 interface, Centronics interface with two programmable RS232 interfaces with transmission rates selectable between 15 and 19248 baud, sound generator, keyboard either with 99 ASCII keys or DIN keyboard with numeric keyboard, 10 programmable keys, self-test routines, auxiliary programs to overcome the differences between various Basic dialects, 10MB Winchester hard disk capability, optional Z8070 co-processor, and mouse.

The employment of Unix is particularly interesting. A Bell Laboratories operating system marketed by AT&T, it is particularly biassed towards multi-user operation and multi-tasking. It is a little surprising, though, that Commodore has opted to employ the obsolescent Unix 7 rather than the allegedly more portable Unix System III and its 1983 upgrade, System V. Zilog which presumably is going to produce the chips for the new Z8000 machine following links between the chip company and Commodore, recently went into partnership with AT&T, Intel, National Semiconductor and Motorola (maker of the 68000 processor used on many Unix machines) to make System V the industry standard Unix.

I asked several executives why Commodore had abandoned their previous close-to-the-chest policy to let public and press into so much of their thinking at such an early stage – indeed, at so early a stage that the plans are bound to change before stocks hit the shops and risk confusing the consumers. It is likely, for instance, that the 264 will have a different name; and judging by the lack of enthusiasm I found for it among the top German brass, the Spectrum-style 116 may never even see the light of day at all. The eventual Commodore PC is unlikely to look much like the Hyperion, too.

Nobody could explain it. But Marshall Smith may have provided the clue when he told me: "We sell to the masses not to the classes. But we have a product for the classes, too ..."

When announced at Hanover in April, it was stated that in addition to this portable PC-compatible system a desk-top version with larger screen would be presented in late Autumn 1984. Both it and the portable already shown will be manufactured in Braunschweig, Germany, and built round the Intel 8008 processor.



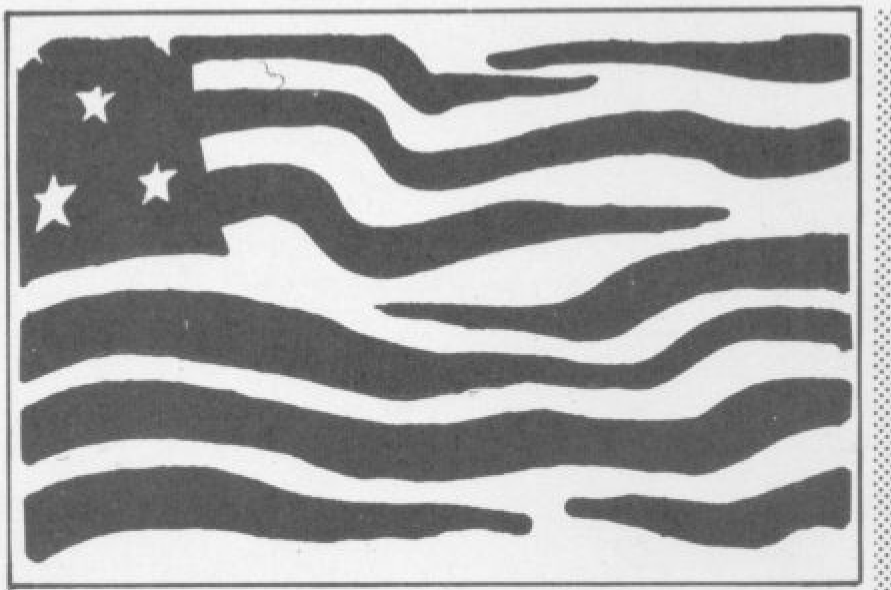
Going West

The Eighth West Coast Faire was held in March, in sunny San Francisco. At ENORMOUS expense a highly drilled team of investigative reporters from your favourite Commodore magazine chartered a couple of Jumbos to cover it for you (well, one bloke who was going that way anyway – to Bristol – got a standby seat in the loo of a biplane). And this is what he saw ...

The West Coast Computer Faire started life as a follow-on from the heady post-Flower Power days of garage tinkerings right at the start of the micro boom. Other computer exhibitions around the world might be the venues for announcements (new products, company mergers, new ways to use tinsel and razzmatazz in promoting computers). But the West Coast Faire has always been the premier users Show, the place for grassroots enthusiasts and whats-available-NOW reality. And though the Show's burly and genial ex-hippy ex-micro-whizzkid founder Jim Warren has sold it to Big Business in the shape of publisher Prentice Hall, the atmosphere of down-home enthusiasm still persists ... more or less.

The Faire had 50,000 visitors. They saw lots of Apple Mackintosh, lots of IBM PCs, quite a lot of business software: that probably represents the thin end of the wedge as far as the home computer enthusiasts go (and go they will). But there was still lots of small-computer goodies on view.

Truth to tell, there wasn't much Commodoreness about the show – not as much as you'd see at an equivalent event in Europe, anyway. And there was a good deal of emphasis on disk-based 64s; disks seem a lot more common over there (nothing to be seen of the new CBM machines, incodentally, and Commodore itself didn't have a stand). But at least some of the Faire's stars ran on Commodore machines.



Make mine music

Like the one that got our vote as Best Product, a thing called MusiCalc. Actually it's several things – MusiCalcs 1, 2 and 3 plus two rhythm 'templates'. It's all on disk, and it's a family of music synthesiser packages that definitely outshines anything we've yet seen for the SID chip.

"Designed to transform the 64 into a musical instrument that anyone from an inexperienced child to a professional musician can play" says the blurb from manufacturer Waveform. That's optimism; MusiCalc is a really sophisticated package, and appeals most to the more sophisticated user. You *can* fool around with it, and you *can* teach yourself synthesising on it: but it really scores as the nearest thing we've yet seen to a full-scale several-hundred-quid music synthesiser. Like the screen displays 'slider' controls, modulators, transposers, a sequencer chart ...

Great stuff. It's a fabulous piece of programming, packaged very well, with excellent manuals; not cheap (about $80 per disk) but well worth the money. We immediately trawled San Francisco for copies (they weren't selling any actually at the Faire) and we're having it reviewed. And we were so impressed that we're trying to fix up to sell it in the UK.

Good graphics

Second prize (*two* subs to CU) went to a joint stand by Inkwell Systems and Micron Technology. The latter does a nicely engineered plug-in-and-go 'eye' comprising a camera and lens on a tripod which attaches via a cable and a cartridge to the 64; the cartridge contains (among other things) an image-sensing chip. As *Byte* magazine's reviewer put it, this can "bring capabilities to your computer that were previously available only to large industrial users".

The MicronEye ("for the cost of a good pair of contact lenses") can be used for all kinds of things – burglar alarms, robot vision, input for graphics and software animation, and much more. It was shown working happily with the Inkwell contribution, a very clever graphics package called Flexidraw that offers professional-quality 2D drawing and image manipulation – it comes with a professional-quality light pen, too. Like the MicronEye was 'seeing' something and digitising it on to the 64's display; it was SAVEd and then reloaded for amendment and general messing around.

Very clever. The bad news is that neither product is particularly cheap by home computer standards – though $150 is not at all bad for a decent graphics package that includes sprite editor and animation utilities as well as a communications facility, and while $485 is a bit pricey for a tripod and camera (there's also a 'bullet' version for embedding in other things at $295) that too compares beautifully with industrial-scale equivalents.

Incidentally, MicronEye has a UK distributor who's loaned us one for review – Mercatek on 0628 528399 has it at £299 plus VAT for the bullet (why is the dollar price lower? search me guv) with the camera available "on special request". The OpticRAM chip itself is available for experimenters, price £33.16.

Great games

After a dull patch, some very good games are coming out of America once again – mostly for disk. The likes of Broderbund, Sirius Software and HES had stands with some good-looking stuff; and a company called Strategic Simulations Inc showed a line of quite extraordinarily imaginative battle simulations.

But quite the classiest games hailed from Electronic Arts: watch out for that name. And in particular look for *Archon*, *M.U.L.E.* and (especially) *Pinball Construction Set*. Graphics, sound and general programming are brilliant on all of them. The last one lets you design your own video pinball games, which is more interesting (and more instructive) than it sounds: "the best program ever written for an eight-bit machine" said Apple wizard Steve Wozniak (it says here).

SHORTS

Instant disk RUN: *Someone told us this in the pub – a program will automatically LOAD and RUN from disk if you enter the LOAD "name",8 and then type a colon and press Shifted Run/Stop.*

Stingalong

Published any good books lately? Turned your work into a movie? Then your major problem once you've bought a larger wallet is what else you can do next with the same material. Of course, the answer is obvious – turn it into a computer game.

That's exactly what Quicksilva has done for *The Snowman*, that superb Raymond Briggs picture book and consequent animated film which had us all weeping with joy in front of the telly last Christmas (and the one before that).

Now for the Bad News; *The Snowman* is available only on the Spectrum at present. Quicksilva is obviously playing it safe; Mark Eyles, one of the directors, says "we're waiting to see how well it sells on the Spectrum before doing a Commodore conversion". It probably *will* sell, although the other Bad News is that a sneak preview showed us it's merely another *Manic Miner* clone.

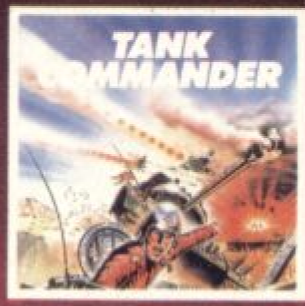
But Quicksilva has at least produced a couple of new 64 games. There's *Boog A Boo*, written by the Spanish software house Indescomp. That game is about a flea. And *Sting 64* (you might have guessed) is a game about bees. We'll be reviewing both these insectile offerings soon as the bugs have been fixed (*ouch – Ed*).



Discover these new games for VIC-20...

These six new games written in 100 per cent machine code, set high standards of playability and really make the most of everything the Vic has to offer. Games of action and strategy, great graphics, glorious colour and full sound effects. Try Submarine Commander, Tower of Evil or Mine Madness and you'll want to try all six.

You should be able to find these games from Creative Sparks at your usual software supplier but you can also order them directly from us, completing the form below.



All action game with strong strategic element. Penetrate the enemy defences and blow up the ammunition and fuel dumps.

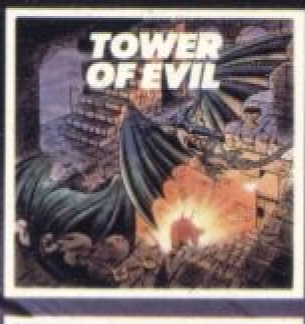
This great game features:
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Requires 8K RAM expansion.
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That is your brief in this exciting game of strategy. Can you stand the nerve tingling action spread over three screens provided by this amazing game.
Already a big hit in the USA.
Superb scrolling screen in periscope mode.
Nine pre-selectable levels of play.
Keyboard or joystick operation.

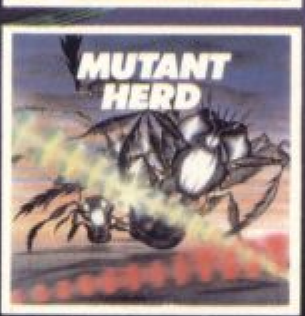
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Action rages throughout.
Move from 70 rooms in the maze-like Tower of Evil, inhabited by such evil creatures as the Baphonets and the Warriors of Ayperos.
To defend yourself, you throw fireballs from your fingertips on your journey to rescue the princess.
Superb action graphics in this 100% machine code game.
One or two player game.
Joystick or keyboard control.
Requires 8K RAM expansion. Cassette **£5.95**



Gold mining with a very big difference.
Half-crazed monsters and lifts which eerily move up and down of their own accord have to be faced in this unusual game.
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Runs on unexpanded Vic-20.
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Protect the powerhouse from the crazy mutants with the help of your powerful crossed laser beams. Guide the laser into the mutant burrows to destroy the eggs.
This unusual and exciting game benefits from two screens of all action play.
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Grappling with print

Pete and Pam Computers is distributing an intelligent printer interface for the Commodore 64 with an equally funny name – it's called the Grappler CD, manufactured by Orange Micro Inc in California.

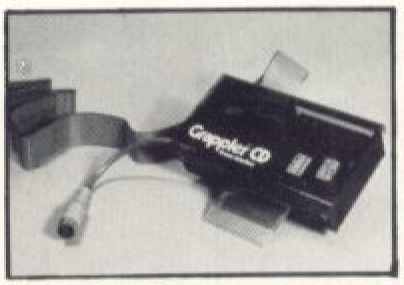
The price, however, is not so funny – it costs a weighty £109 (including the necessary cables).

According to P and P's blurb, the Grappler has a Commodore 1525 printer-emulation mode – which means you can connect a variety of dot-matrix printers, like Epson, Star and NEC, to your 64; and they'll work as though they were Commodore models, to produce all Commodore's graphics and special characters.

Grappler plugs into the 64's expansion port from which it takes its power. It has its own Commodore-type serial port for CBM printers and a Centronics parallel port for connecting the other printers of your choice.

Its standard print features include high-resolution graphics screen dumps, a 'transparent operation' mode, and block-graphics screen dump. It's claimed to have a wide selection of commands including double-size, inverted, rotated and emphasised graphics.

The device also has text-formatting facilities like margin and tab settings, page length and skip-over perforation. We'll soon be grappling with a review copy (*Ho-ho – Ed*). In the meantime, more information on 0706 217744.



SHORTS

Blopper bugs: *In Chris Preston's* Blopper Victual *(February 1984) a couple of typos unfortunately crept in – but nothing to stop the program running. On page 71, the explanation of the programs refers to line 450; this should in fact be line 460. On the program listing, line 160 refers to line 145; this should be 150. Sorry!*

SHORTS

Memory saver: *Well, it doesn't save a lot of memory. But if you have a GOTO statement, you can put a REMark after it on the same line without including the 'REM' statement. The program never looks beyond the GOTO, you see ...*

BC BASIC

The BC Basic cassette offer in the Deals For Readers section is now at an end (we're sad to say) so please, no more orders.

PS: DFR's will be back bigger, better and with even more bargains next month!

SHORTS

Going up: *Home computer ownership has more than doubled in Britain during the past year and the market looks set for further record growth, said a new survey in February. More than one home in ten had a micro in January 1984, 11 per cent of households compared with 4.9 per cent in January last year.*

Gowling Marketing services says it is difficult to see any long term future for less popular models or for new entrants "unless they can offer some important advantage."

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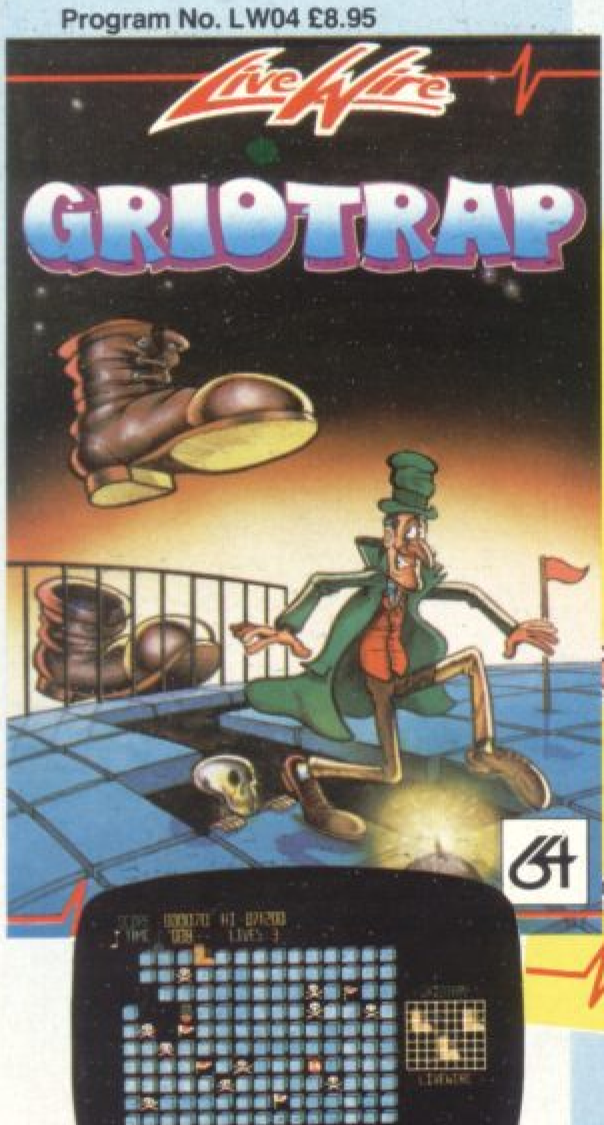
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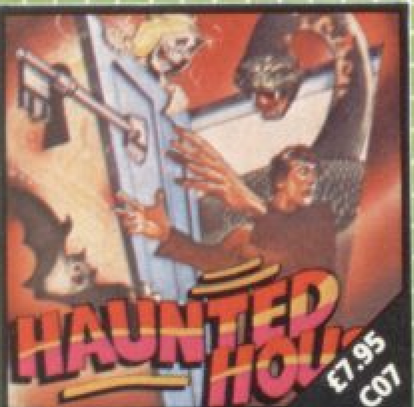
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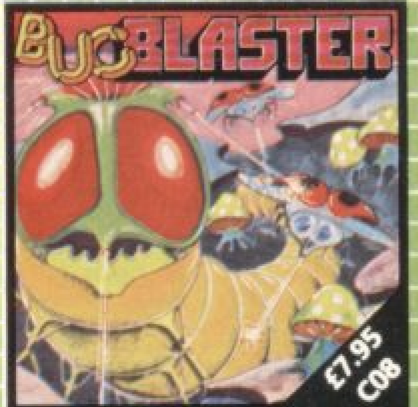
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COM USER 5/84

Bed, breakfast and Basic

a Worcestershire weekend for Basic beginners

by Bohdan Buciak

If computers worry you and you don't know what all the fuss is about, a weekend computing course might be just the thing to allay fears of missing the hi-tech bandwagon.

Gainsborough House Hotel near Kidderminster runs just such a course, exclusively on the Commodore 64 – two nights in three-star comfort, a minimum of 18 hours tuition, all for £65. Bohdan Buciak packed his suitcase – and returned a changed man.



"Are you on the computing course? There's sherry in the Bar, dinner will be served at 6.30." Staff at the Gainsborough House Hotel have got used to the uneasy and confused faces that appear at Reception on a certain Friday evening every two months.

Most of the assembled have come to this secluded outpost of Kidderminster straight from work, from as far as London and the South Coast. Nobody professes any real knowledge of computers; only one person already has a 64, and two people have used a word processor. There won't be much experience to draw on. But there's a real mixture of real people: dentist, architect, insurance broker, an assortment of people who confide, "actually, I run a small business". Plus one journalist ...

Unusually for the computer world, most of the people are women. Women outnumber men by 12 to 8. Isn't that a little unusual? A concerted, slightly feminist reply: "didn't you see the article in *Company* magazine?" *Company* it transpires, had written a good report on the course and had proudly asserted in its article, "The first programmer in history was a woman", thus inspiring these coiffured, demure ladies to take the programming plunge – in the wake of the brilliant Ada Lovelace (friend of Charles Babbage, he of the intellectually advanced and practically impossible Engines).

Dinner is leisurely and chatty but nobody seems particularly hungry. We talk rather shyly of our plans. Most of the ladies "with small businesses" know that computers could be useful to them but don't know anything about them. They're here to undergo demistification. We all nod sagely and pass on to the trifle.

First impressions

After coffee we wander upstairs to a room full of hi-tech hardware. We meet Harry Siddall, the course tutor; short, stocky, bustling. He's rushing around with an assortment of plugs and wires, making the mayhem of tangled cable even worse.

All the much-travelled Commodore 64s eventually work; there's thirteen of them, plugged into amber (not colour) monitors. "Some people will have to share", apologises Harry. But nobody minds that; they couldn't really be expected to take on a 64 singlehanded. One person had brought his own 64 and he shared that too. "I bought the thing a while ago because my son's learning about computers at school. Couldn't get past page ten of the manual", he sighs.

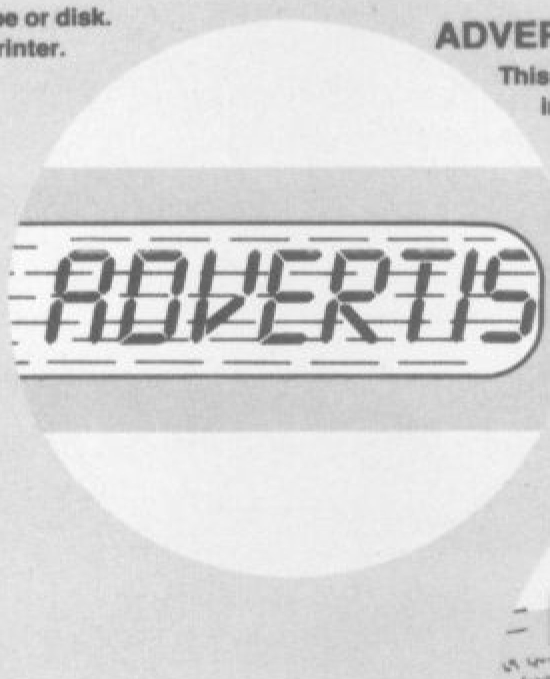
It's 8.00pm on a Friday evening, but the course starts here. Harry begins in jovial mood, a tone he kept up to the very end of the course. He's a born teacher, patient and thorough – taught electrical engineering for 20 years, then was made redundant. He set up a computer training company that folded. Now he

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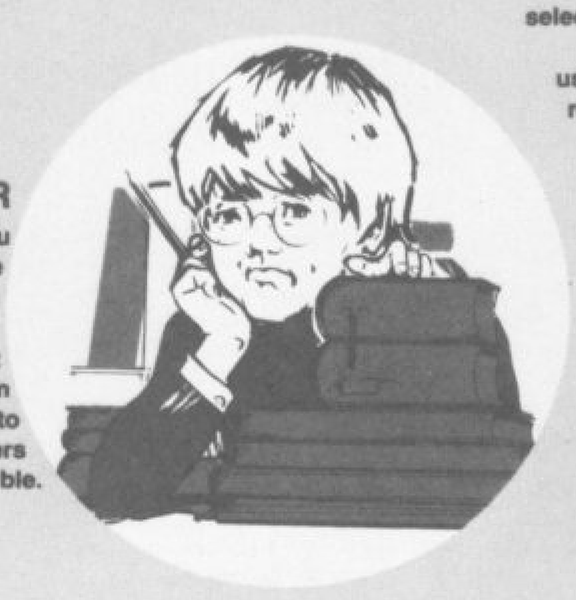


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teaches for himself, inspiring people with his own fascination with computers.

That fascination leaves him with little time to waste; he knows these empty vessels must be filled by Sunday. So we're summarily propelled into basic Basic commands (Harry apologises for that one).

"Typing NEW is like throwing your existing business records into the bin." We get the point. Then we're whisked along to PRINT statements. "You can print anything on to the screen, even rude words," quips Harry. But nobody could think of any – such nice people. That's followed by elucidation on REM statements. "If you write something rude into the program ..." Harry's getting carried away.

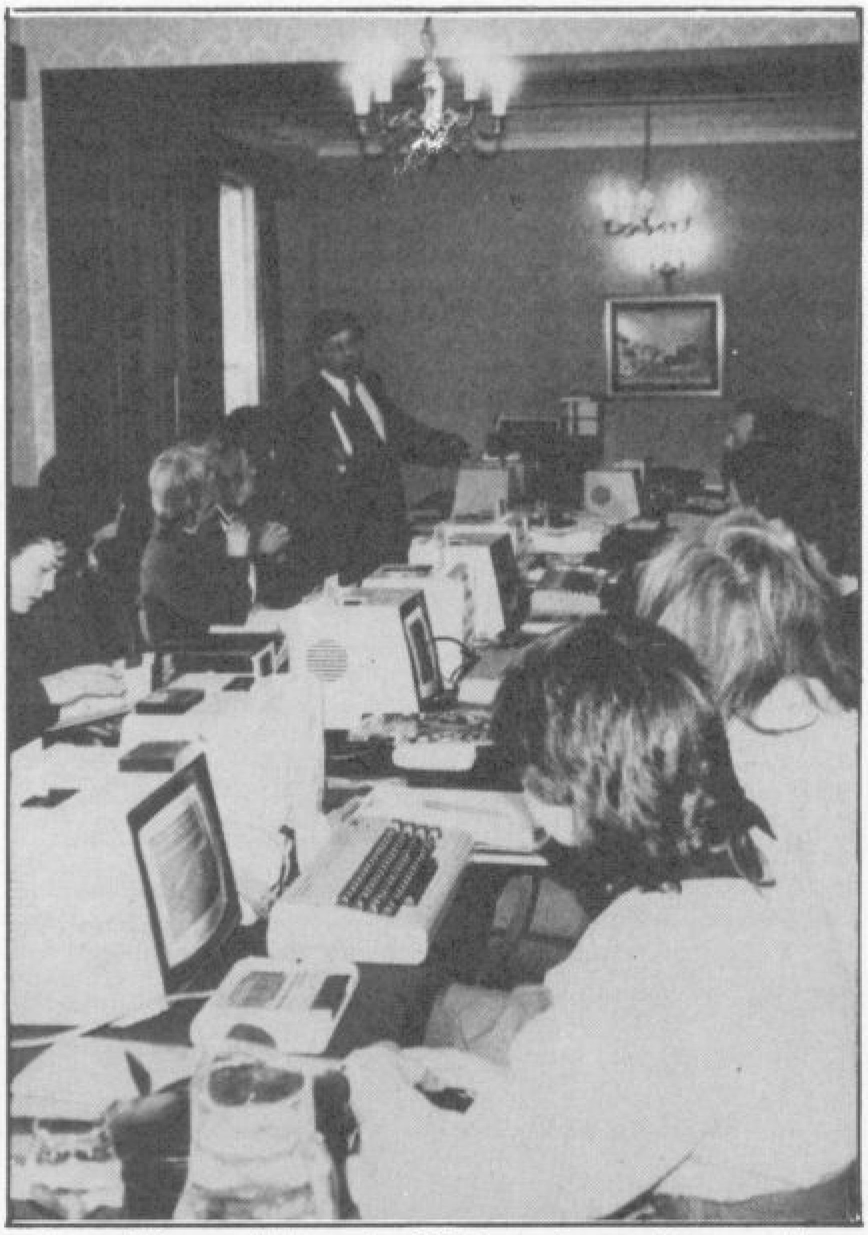
When we've assimilated LIST and digested LET, we start writing a program to calculate Harry's tax. That's pretty good going after two hours. And it all works very well. We modify it a little and add variables – we know the difference between strings and the numeric type. That works too. Harry flits around: advising and explaining here, modifying there, perhaps consoling those who are struggling – totally oblivious to time.

But it's getting on for midnight and a few of us are fading rapidly. Harry is made aware of this. "You can take a 64 up to your room and plug it into the telly if you like." Nobody appreciated that joke but he's got more up his sleeve. "Back here in the morning for some more torture." The stalwarts trudge down to the Bar for a nightcap. "He'd lost me by 11 o'clock", says one of the combatants. The rest of us glow with tired satisfaction. We've made the computer do something, and something practical at that.

Early start

Saturday morning alarm call at 8.30am: this is no place for Big Sleepers. Breakfast is leisurely but by the time we get upstairs to the micros, a few people are already diligently programming (did they stay all night?). People mumble something abou[illegible] getting part of Saturday [illegible]on to ourselves.

Jovial and irrepressible Harry begins with a recap and decides we need to know some theory – the difference between tape and disk, bits and bytes, ROM and RAM, the central processor. This is all stuff most of us have heard before but could never really



understand. Harry scribbles and draws on the board. He's lucid and invariably repeats ideas twice. That might get on your nerves if you already knew a little.

"The processor is like a tower-block with 64 floors ..." We struggle to grasp the ideas. One teenager (he's come with his parents) is catching on quick but he's already got a BBC micro. And he wants to know more: "what's the difference between 8-bit and 16-bit?".

Harry sees the danger signs and slips down a sidestreet. He's loathe to complicate issues. "You need the theory so that the words the dealer uses when you buy a micro mean something." He explains about greater power and speed, and leaves it at that – time for lunch, anyway.

The help-yourself salad over, a few gulps of coffee and we return. Harry's been sprinkling the word 'business' around a little during the course. Now he takes the plunge and devotes a little time to that issue. He gives a brief discussion of Visicalc. A battered copy of the manual is passed around: "Oh dear, it's got such a lot of pages".

Then he goes through the general implications of buying business software. This is useful for the small-business people. One lady's been thinking about spreadsheets. Another has contemplated installing a database for her staff agency. They've all been scared to talk to dealers – they don't understand the words and they've never even used a computer before. But Harry is trying to put all that to rights. He's got no specific advice to offer but at least he's stripping away a little of that ignorance and inspiring a modicum of confidence in its place.

The rest of us are eager to carry on programming. Harry wraps up that section and introduces that wonderful device, the FOR – NEXT loop. We see what happens when you put your INPUTs inside and outside the loop. Then we design a letterhead on the screen using a few of the 64's graphic characters. And find out how to turn our work into a program so we can print it.

Time is slipping by and it looks as though most of us are here despite the supposedly free afternoon – we're all pretty engrossed, doing our thing, even flicking through the manual to see how we can extend that program we wrote yesterday. Harry gives help where needed, leaving most of us to experiment by ourselves. The more adventurous get more frustrated because they don't know enough to make the program do more. They're trying to run before they can walk – but that's a good sign.

Saturday night fever

Saturday afternoon saw our pinnacle of achievement; we'd programmed like never before. So after dinner (yes, even while *The Late, Late Breakfast Show* was on), we're back with a vengeance.

But there's a general feeling that this is going to be another mammoth session. Harry hasn't let our efforts go to waste. We've saved our work on tape and even verified it after loading. So now we load our letterhead and extend it into a basic invoice program that adds up a number of items. Harry scrawls new lines on the board, explaining as he goes, his hands getting blacker and blacker with the felt-tip pen he's using.

Nobody suggests that what we've written could be used in *real* business. But it *did* work and gave us an idea of how true business software works – stripping away another piece of that mysterious shroud.

We were right about not getting away before midnight (again). Harry's hands are blacker than ever and he's still scrawling indefatigably on the board. Attention wavers as some contemplate going straight to bed, others dream of getting down to the Bar. Some make it, and manage to lift a few glasses before turning in.

Rainy days and Sunday

Probably none of us had asked for a Sunday morning alarm call. We still got one and came down to a blustering wet morning. Like yesterday, a few keen souls were already tapping keys whilst the rest were breakfasting. By now, there's a feeling creeping in that we're reaching the end; formal

teaching till lunch and then games or a look at the database and word processing package Harry's supplied on the other side of our tapes. We plan to settle our bills and depart some time after lunch.

But we've still got PEEKs and POKEs waiting for us before all that. "Harry, can you PEEK before you POKE?", asks one of the demure ladies. Harry smiles. He's heard them all before and his own jokes haven't been much better. We then go on to random numbers and how you can specify an integer and the range of choice for the random number generator.

Harry shows us how to write a program that acts as a teaching aid, another one of his ways of getting us to do practical things with the 64. He scrawls on the board (hands getting blacker) explaining the lines as he goes.

The finished product is an interactive multiplication tables program. We're very proud of it. Some of us take printouts of the programs we've written, perhaps as souvenirs or as evidence that we really did write them. "How can I get it to give the answer if you don't get it right after the third attempt?", asks someone. No need to tell the rest of us, Harry – we already know about IFs and THENs.

That just about wraps up the course. Taxis have been ordered, bags are being put into cars. Everybody agrees that if Harry did a follow-up, we'd all try to be there. One last thing before we go: Harry presents us all with a signed certificate. It's all just for fun, but a nice touch nonetheless. One lady hasn't got one. "Better give me one, or my husband will wonder what I've been doing all weekend."

Overview

Gainsborough House Hotel is keen on the courses Harry Siddall runs. They occur about once every two months, designed for the absolute beginner. The course itself represents tremendous value at £65. But don't go if you already know a little about programming or you already use a computer in business.

Apart from the Basic programming side which is elementary yet useful, there's an emphasis towards business use. Harry Siddall tries to explain both the jargon and the different species of software available. Again, it's elementary stuff – completely for the uninitiated.

We had a lot of fun in pleasant and friendly surroundings. The course taught us a great deal; a pleasant, interesting, painless start to Basic programming. For many participants, some of it will, no doubt, fade in time. but for those who were completely ignorant of computers (there's still a lot of them around) at the very least the course must have been a comfort. They'd taken the plunge and no longer felt left out in the cold.

Under review	Weekend Basic programming course
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The Vic-20 Extendiboard

Build your own extension board – with 3K on it already!

by Mark Brighton

We've often had requests for simple DIY electronics projects to do useful things with the Vic, and most of them centered on ways of beating the prices suppliers charge for extra memory and cartridge-slot expansion boards. Well, we were just about to commission such an article – when we spotted Mark Brighton's Extendiboard project in the December 1983 issue of Electronics, the magazine published by Maplin Electronic Supplies.

This allows the Vic to be fully expanded. It gives you three expansion sockets, one switchable: it has the option for a 3K on-board RAM chip: and Lord knows it's cheaper than any 3K RAM cartridge we've seen, let alone a 3K-plus-extra-sockets add-on. A parts list is included; and if you buy them from Maplin, you'll pay £26.95 for the lot.

So, with due acknowledgement to *Electronics*, here's a money saver for all you Vic owners with soldering irons ...

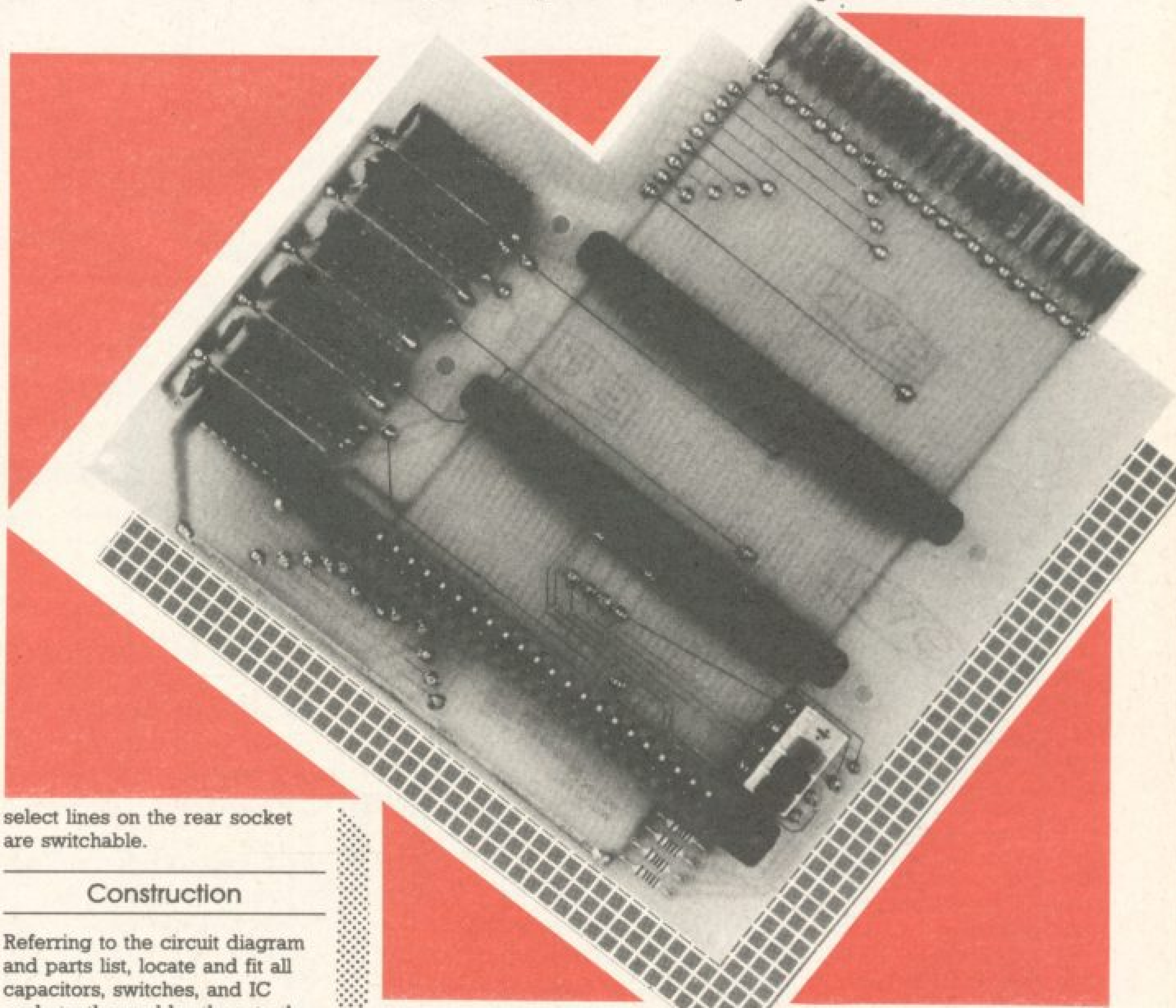
One problem frequently experienced by the author when programming the Vic-20, especially when using hi-res graphics, is lack of memory (within the computer, usually!)

This may, of course, be easily overcome by plugging a RAM pack into the expansion socket. But that creates a new problem. No longer is it possible to use a Super Expander/Machine Code Monitor/Forth cartridge etc because the socket is occupied.

Therefore the subject of this article is an extension board which plugs into the memory expansion connector on the Vic and provides three sockets into which any combination of RAM/ROM cartridges may be plugged (within reason, of course – two games cartridges at once would give your Vic a severe headache).

In addition to these expansion sockets it was considered worthwhile to include a built-in 3K RAM extension on the board, thus freeing a socket from carrying a 3K RAM cartridge. This is optional, however; it may be omitted by leaving out ICs 1 to 16 and capacitors 1 to 5 inclusive.

For those who wish to experiment with switching blocks of memory in or out, during initialisation for example, the block select lines on the rear socket are switchable.



Construction

Referring to the circuit diagram and parts list, locate and fit all capacitors, switches, and IC sockets, then solder them to the board.

Observing normal precautions for CMOS devices, plug ICs 1 to 6 into their sockets.

Clean the board and inspect for short circuits, dry joints, etc.

Testing

Plug the extension board into the memory expansion connector on the rear of the Vic, and switch the computer on. If all is well, the Vic should initialise and display the message '6655 BYTES FREE'. (if ICs 1 to 6 are included).

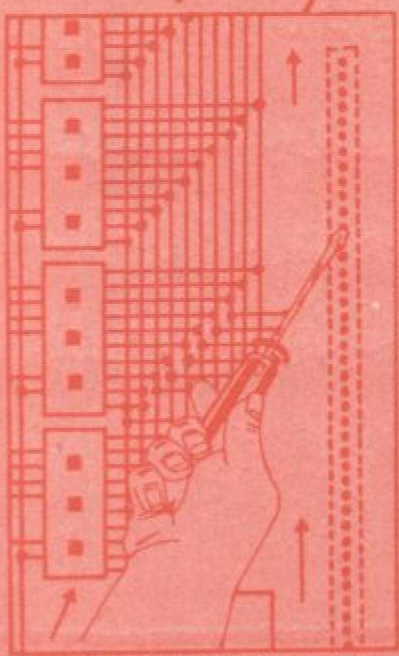
Now try entering and running a small Basic program from the keyboard to check the operation of the 3K RAM extension.

Lastly, try a game cartridge, or similar, in each of the three sockets of the board in turn.

Remember to switch the computer off before attempting to remove or replace a cartridge or the extendiboard.

Usage

As there are many possible uses for an extension board such as this, they could not all be covered in this article. I shall



however attempt to outline a few:

- One 16K RAM cartridge and one 8K RAM cartridge, for those who write very long programs or wish to handle large amounts of data. This is the maximum memory extension available to Basic on the Vic-20
- The machine code monitor cartridge is not normally usable in the fully expanded Vic, as its address area lies within the top 8K RAM area. It could, however, be used in place of the 8K RAM cartridge, which still leaves a very considerable area for machine code program storage
- Maplin's Talkback speech output device or similar add-ons, plus extra RAM if required, can now be used together. Programs can be written using hi-res graphics, complex sound effects, and speech synthesis in Basic or machine code. Your programming abilities and imagination can come into full play – the possibilities are limitless

It should be remembered that if 8K or 16K RAM cartridges are used, the on-board 3K expansion or a plugged-in 3K RAM cartridge are not available for Basic program storage – this is because of the way the operating system arranges screen memory during initialisation.

This area (decimal 1024 to 4095) is still useful for data storage using PEEK and POKE from Basic; or it can hold machine code to be executed using 'SYS' or 'USR'.

A complete kit of all the parts required for this project is available from Maplin Electronic Supplies Ltd., P.O. Box 3, Rayleigh, Essex LK22Y, price £29.95

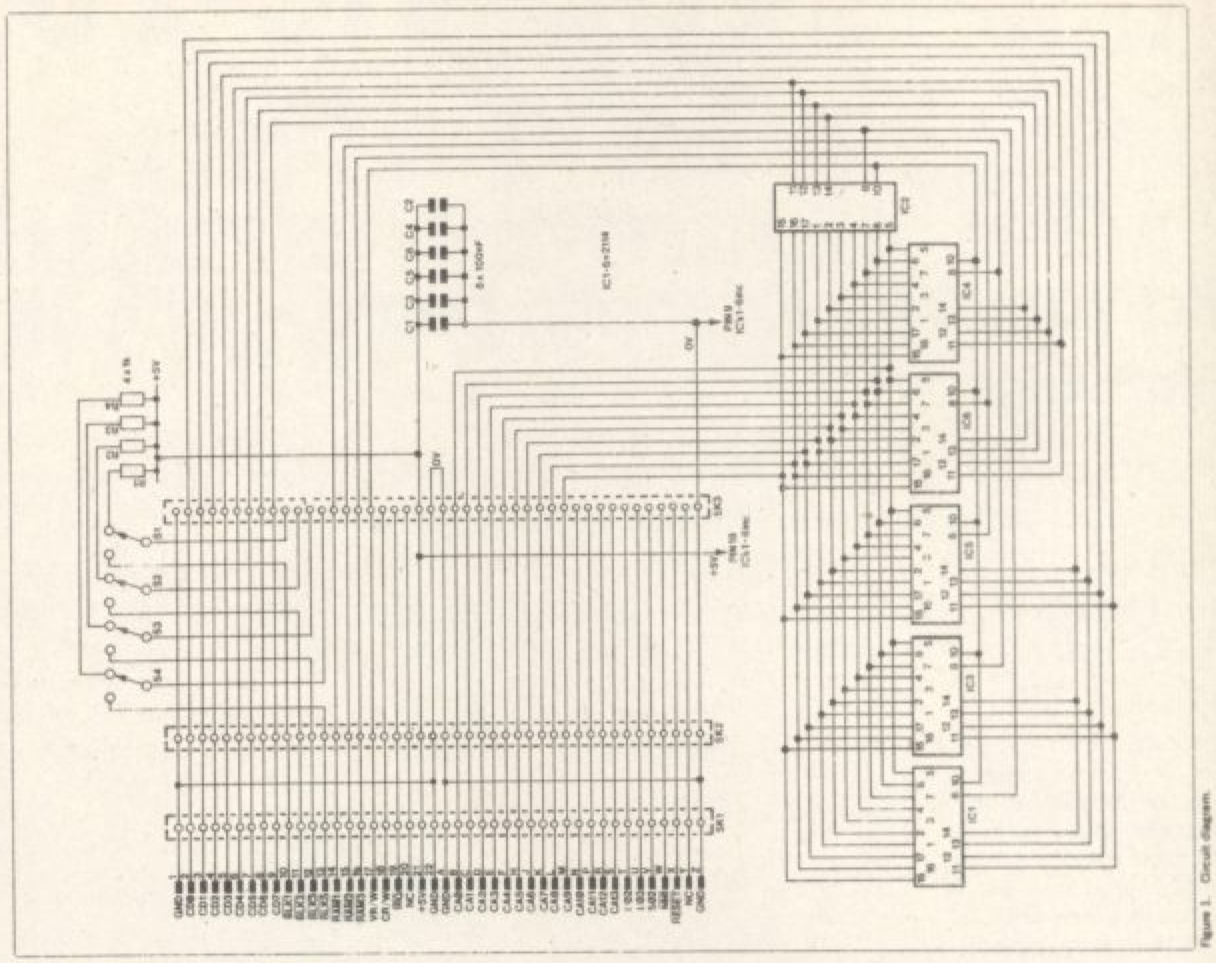


Fig 1. Circuit Diagram

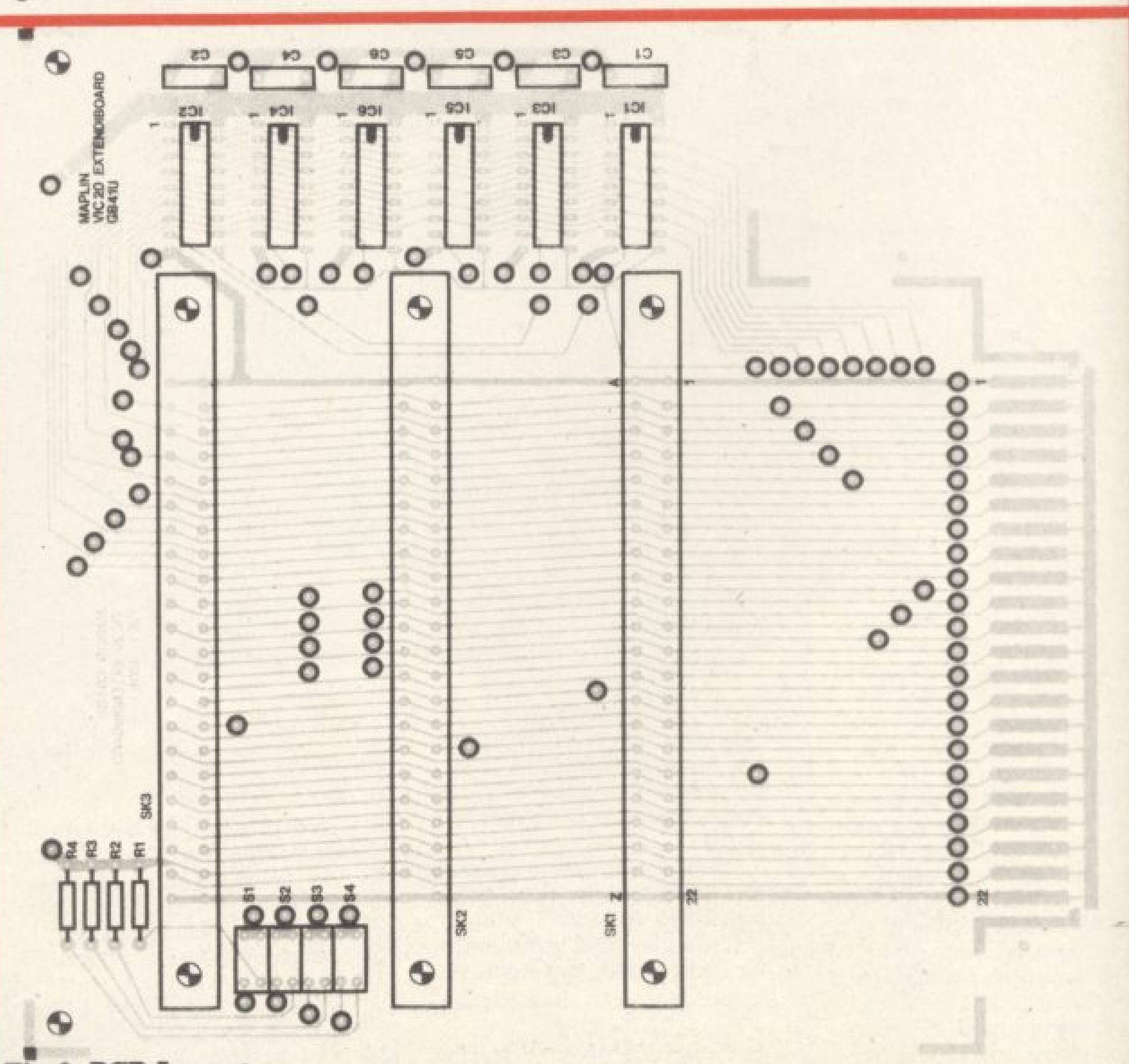
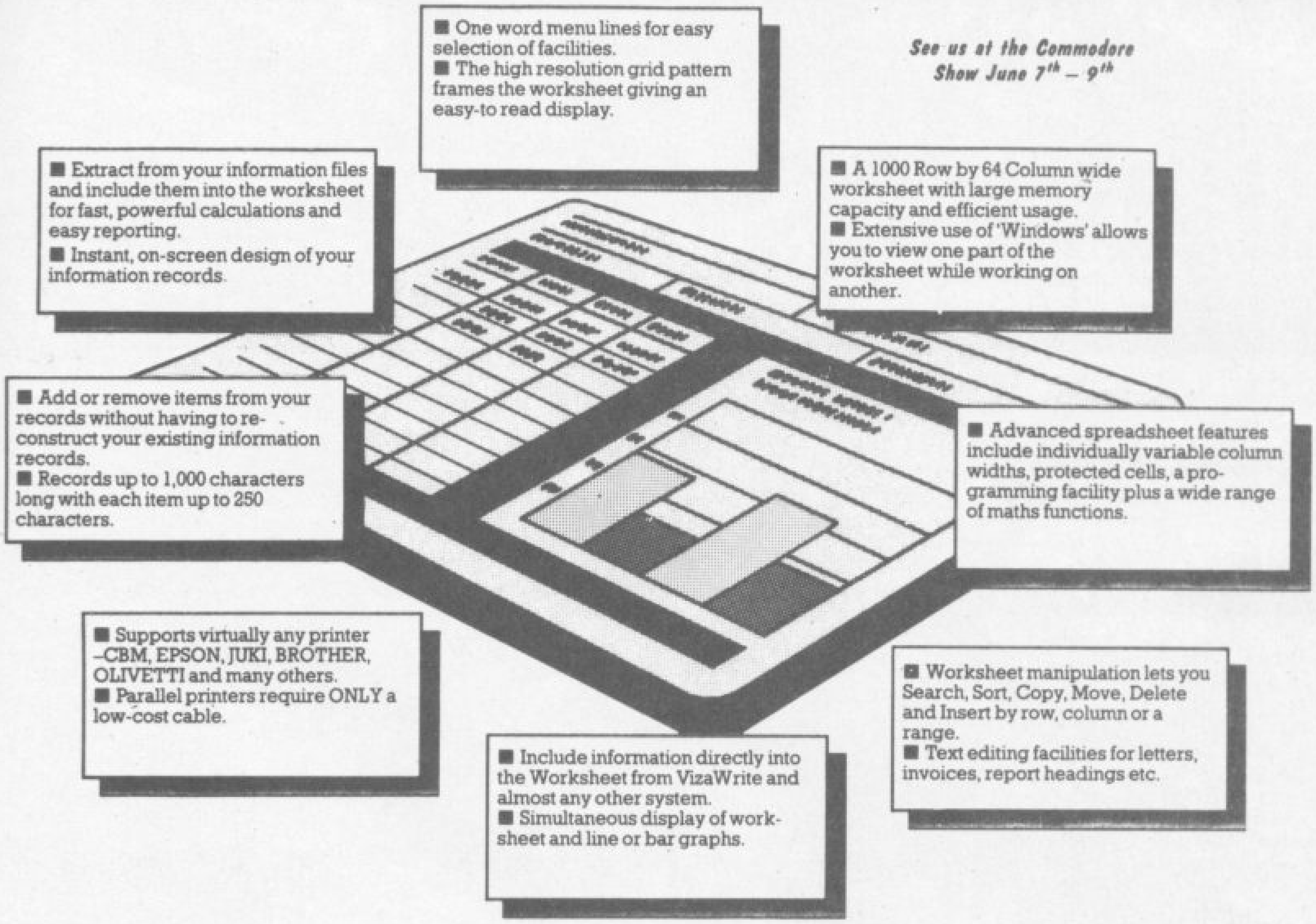


Fig 2. PCB Layout

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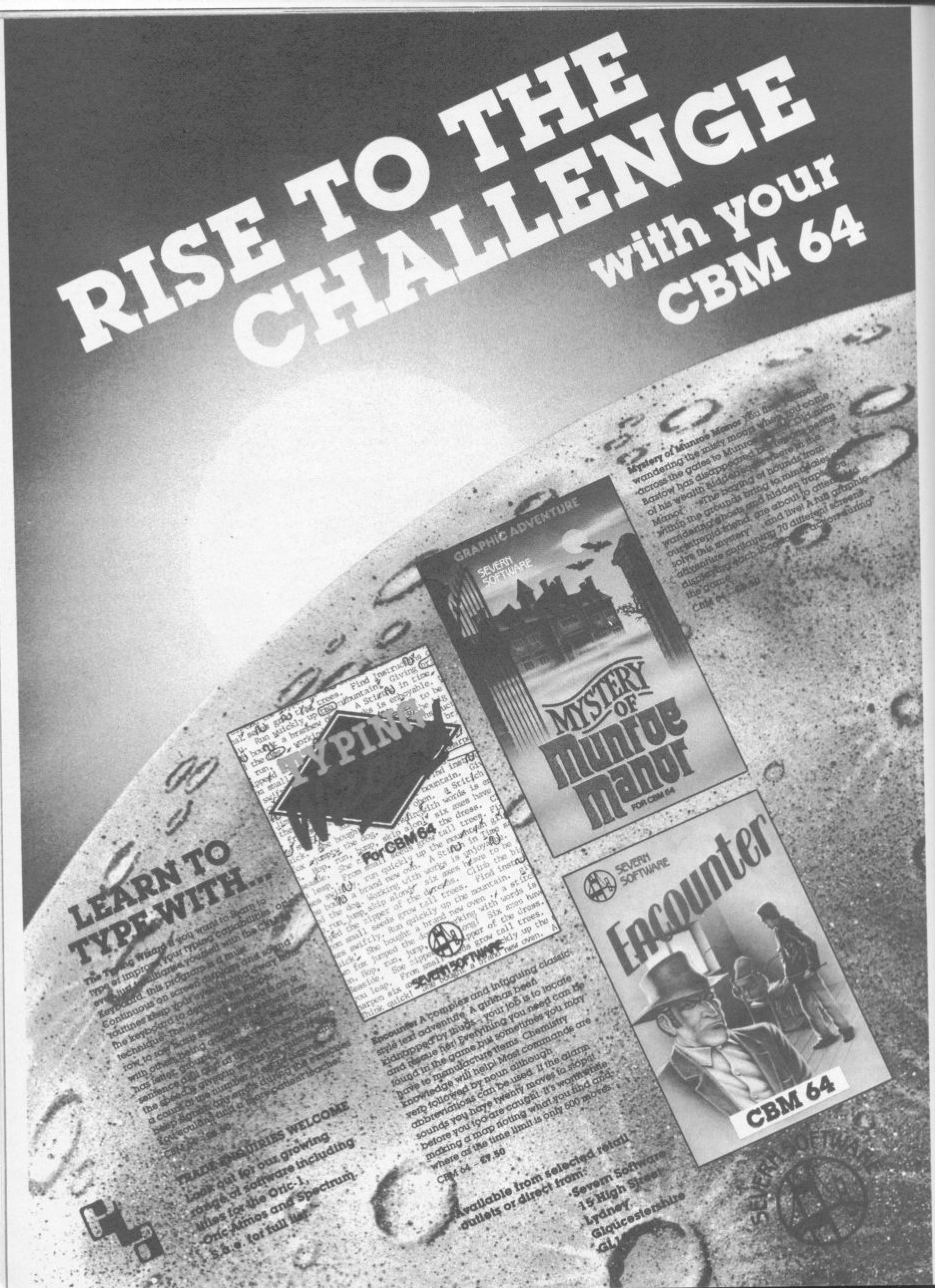
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SPC and TAB

by Chris Preston

Producing decent screen displays is often a major part of a program. I have often seen programs written by beginners where every PRINT statement is full of spaces, things like ...

```
PRINT "                    ";A$;"              ";B$
```

or this:

```
SP$="                              "
PRINT LEFT$(SP$,10-LEN(A$));A$
```

(This last pair of statements, by the way, is just to ensure that *A$ ends* at a particular column on the screen.)

There are, however, far better ways than this of producing decent screen layouts. Let's have a big hand for two of the underrated functions in Commodore Basic – the dynamic duo, SPC and TAB.

These two statements both do more or less the same thing, and both can only be used inside a PRINT statement.

Let's start with SPC. This ...

```
PRINT "A";SPC(5);"B"
```

... prints an 'A' and a 'B' with five spaces inbetween. In fact SPC just moves the cursor along a certain number of places on the screen.

The number in the brackets decides how many: it's called the *arguement* of the function and it can be from 0 to 255 – anything outside this range gives an ILLEGAL QUANTITY ERROR. If the cursor is in column 15 and you say PRINT SPC (10), the cursor will wrap around on to the next line in the usual way.

The TAB function is slightly different. If you use PRINT TAB (15);A$, the computer will print A$ *starting at column 15*. In other words, rather than moving the cursor a certain number of spaces as the SPC function does the TAB function moves the cursor to a particular column. It is important to remember that the columns on the screen are numbered from 0 to 21, *not* 1 to 22.

The limits on the arguement are 0 to 255, as with SPC, and the same thing happens if you put a large number (greater than 23) in the brackets – that is, the cursor will move on to the next line. Or even further, if necessary. TAB(30) moves to the middle of the next line, TAB(55) puts the cursor on the middle of the line after that, and so on.

Here is a short program which should illustrate the difference between the two functions:

```
PRINT "A";SPC(5);"B"
PRINT "AB";SPC(5);"C"
PRINT "ABC";SPC(5);"D"
PRINT "A";?TAB(5);"B"
PRINT "AB";?TAB(5);"C"
PRINT "ABC";?TAB(5);"D"
```

What if you say something like this:

```
PRINT "0123456789",TAB(5);
"ABCDE"
```

After printing the first string, the cursor is in column 10 (remember the column numbers start at zero) when Basic meets the TAB(5). As it *is* already in column 10, it just gives up and prints "ABCDE" immediately. So the display on the screen is:

```
0123456789ABCDE
```

There is a subtle and very important difference between these two statements. Try this:

```
PRINT "A";"     ";"B"
PRINT "A";SPC(5);"B"
```

In fact, SPC and TAB don't actually print spaces; they just move the cursor, rather like PRINTing a string of 'cursor right' characters. So if there is a character already on the line at column 2, the first statement will overwrite it but the second will leave it, as the program shows:

```
10 PRINT "[CLR] B"
20 FOR I=1 TO 5000 : NEXT
30 PRINT "[HOM]A;SPC(5);"C"
40 FOR I=1 TO 5000 : NEXT
50 PRINT "[HOM]D E"
```

This will not affect programs, unless you are updating a screen which already has data on it. In this case, the choice of printing spaces or using SPC and TAB depends on whether you want to leave data already on the screen or remove it. If the screen is empty, of course, there is no difference between the two alternatives.

Now dig out your own programs, and see if you can replace some messy old PRINT statements with neat new ones using SPC and TAB!

Fun

Prizeless, pointless contest: the Commodore Quiz

by Roger Peacock

1. IF YOU SENT YOUR VIC-20 TO SLOUGH FOR CONVERSION TO A CBM-64, WHAT WOULD YOU GET BACK?
   (a) Nothing
   (b) A copy of 'How to be a Wally'
   (c) A special POKE location
2. THE 1540 DISK MANUAL IS WRITTEN IN WHICH LANGUAGE?
   (a) Swahili
   (b) Urdu-Cobol
   (c) Machine Code Dyslexia
3. THE NUMBER 1024 REPRESENTS WHAT?
   (a) The number of monthly computer magazines published
   (b) The number of mistakes in *Vic Revealed*
   (a) Tommy's IQ
4. THE LETTERS 'P.E.T.' STAND FOR WHAT?
   (a) Piles of Electronic Tackle
   (b) Pre-runner of E.T.
   (c) Put on Every Table
5. THE USE OF AN ELEPHANT IN 64 ADS IS DESIGNED TO TELL YOU WHAT?
   (a) The 64 is very heavy
   (b) The elephant wrote the handbook
   (c) Commodore Users have long memories and thick skins
6. HOW DO YOU RECOVER FROM A VIC DISK ERROR?
   (a) At a private health clinic
   (b) With a 12lb sledge hammer
   (c) By using the cassette recorder
7. THE NUMBER '10' REPRESENTS WHAT?
   (a) The age of David Simons
   (b) The number of people in the world who can program random files on the Vic disk system
   (c) The production cost in dollars of the 64
8. HOW DO YOU CHANGE THE VIC-20 SCREEN LOCATION
   (a) Move the sideboard
   (b) Pinch the kitchen table
   (c) Take your RAMpacks out
9. IF YOU SPEND 3 HOURS TYPING IN A 5000-LINE PROGRAM AND TYPE 'RUN', WHAT WOULD YOU NORMALLY SEE FIRST?
   (a) SYNTAX ERROR IN LINE 1
   (b) CBM BASIC 3583 BYTES FREE READY
   (c) Your psychiatrist
10. WHAT IS THE MAIN FEATURE OF THE VIC MEMORY MAP?
   (a) You can't remember it
   (b) Slough is just off the M4
   (a) 42
11. WHAT IS THE METROPOLITAN?
   (a) Clive Sinclair's Barber
   (b) The pub where **Commodore User** is written
   (a) Jim Butterfield's brand of razor blades
12. IF YOU HAD AN 'OUT OF MEMORY' ERROR DUE TO GARBAGE COLLECTION, YOU WOULD HAVE ...
   (a) Forgotten to put the dustbin out
   (b) Upset your dustmen with three tons of old computer magazines
   (c) Bought a cassette game

That's enough questions Ed.)

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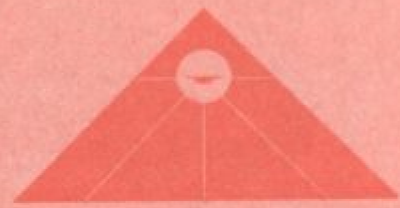
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C

Plug-in graph plotting



Vic-GRAF reviewed

by Colleen Young

This is one for the mathematicians amongst you! VIC GRAF is a cartridge which allows you to study functions graphically. You specify a function and the program will plot a graph of that function and give you any data you require, such as maximum or minimum points; it will also give you the coordinates of the points where the graph crosses the x-axis and evaluate integrals.

Let's look at these features in more detail. When you switch on with the cartridge attached to the Vic the screen displays:

```
Y(X)=

        ↑ DEFINE FUNCTION ↑
```

You must type in the function you are interested in, and this must be in terms of x. Suppose you are interested in the cubic equation $y=2x^3+3x^2-11x-6$ you would type2*× ↑ 3+3*× ↑ 2−11*x−6.

You are allowed a maximum of 76 characters for your function, which should be quite enough!

Having typed in your function and hit RETURN you should see the program's menu screen giving you the following seven options:

```
              MENU:
        FOR SERVICE PRESS:

F1=PLOT THE GRAPH
F2=NEW FUNCTION
F3=AXIS INTERSECT
F4=EXPOSE FUNCTION
F5=FIND MAX. & MIN
F6=CORR. IN EQUAT.
F7=EVAL. INTEGRAL
        STOP RETURNS MENU
```

Pressing the appropriate function key selects the option you require. Usually you will want to see the graph first; press F1 and you will be asked for the range of values of x that you require.

Continuing with the example, let's have a look at the graph for the range −4 to +4. Type it in (−4,4) and sit back and wait. The Vic will now calculate the value of the function for 160 evenly-distributed values in the specified range, depending on the complexity of the function this can take up to 20 seconds. Then the graph is plotted in high resolution on the screen.

Here's what you would see:

```
          NEW INTERVAL?  YES NO

                126

                 84

                 42

 −4      −2       0       2       4

                −42
```

Plotting the graph takes about a minute. The axes are always placed such that the graph will fill the display. Sound accompanies the plotting of the graph, too – up or down the scale if the graph is going up or down, a rather odd noise round turning points! This drove me (and my Sixth Form) mad after a short time; still, you can always turn the volume down.

Once the graph is plotted you are given the option to plot it again over a different range of values of x; this means that you can 'blow up' any part of the graph to see it in more detail. For example, you might wish to have a look at the above graph between x=+2 to investigate its behaviour round the origin.

Once satisfied with the graph you may request data on turning points or intersection with the x-axis; for this example the program would find a maximum at −1.94, 12.028, a minimum at .94, −12.028, and axis intersects at x=−3, x=−½ and x=−2.

Another nice feature is evaluation of integrals. You can find the area under the graph for a specified range; the program uses Simpson's Rule to evaluate the integral.

It is possible to return to the menu at any time using the RUN/STOP key.

I have mentioned most of the options, but there's also F2 (which allows you to define a new function), F4 (simply displays the current function) and F6 (lets you correct or amend the current function).

The program will never crash with a 'division by zero' error since every value of x is increased by a billionth. So it is possible to study any graphs with discontinuities such as 1/x. Depending on the range of x specified, the graph may look rather pathetic! But it is easy enough to alter the range, so this does not present a problem.

Attempting to plot a graph of a function such as $x^{1/3}$ requires care since the Vic, like many calculators, returns an error when trying to raise a negative number to a fractional power.

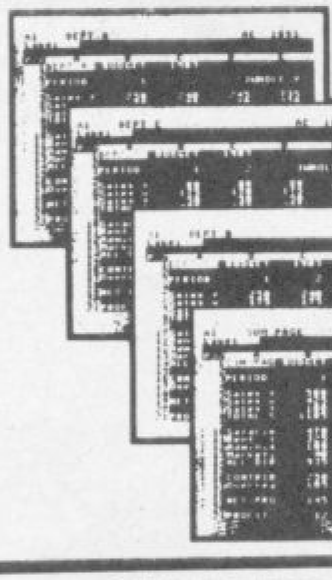
Boolean expressions are not permitted when defining the function: it is possible to get round this problem by using an expression such as X/ABS(X) to give the sign, for this will be −1 when X is negative and +1 when X is positive.

VIC GRAF is very easy to use, and the instructions which come with it are very clear and helpful. As a maths teacher I find this extremely useful; it's one of the best programs I have for my Vic. My pupils at school have also learnt much from it.

Under review	VIC GRAF
Description:	Cartridge giving Graph-plotted representation of mathematical functions
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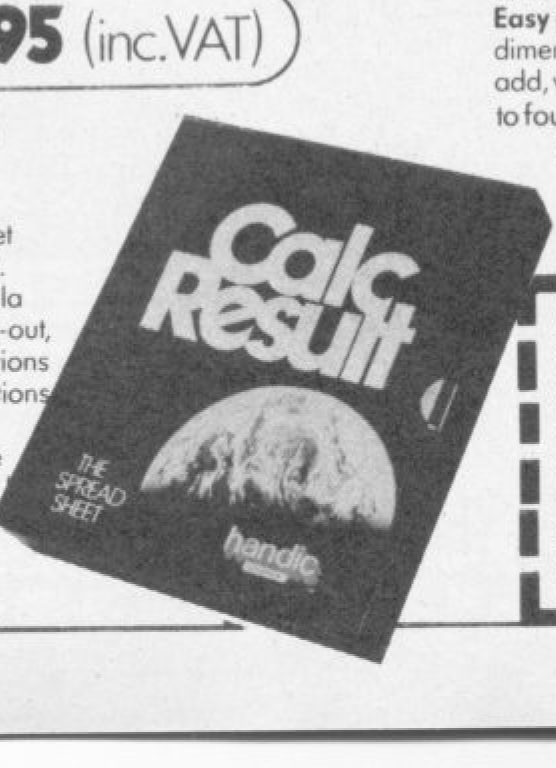
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Thinking ahead



Forth and the Vic

Part Two — Vic-Forth reviewed

Vic-FORTH is a cartridge implementation of Forth produced for the Vic-20 in Sweden. Handic sells it in the UK and provided me with a copy for evaluation.

The cartridge comes packed in the standard Commodore-style wrapping, the contents of which are mostly box, the cartridge and a manual.

The manual has a glossy science-fiction picture on the front – which has little to do with the subject matter, other than I suppose that one of the first applications for Forth was to guide the Kitts Peak astronomical telescope!

At first glance the size of the manual is disappointing: just 32 A5 pages. Forth radically changes the familiar parameters learned from the *Vic Programmers' Reference Guide* and a manual approaching that size would be the first reference source to turn to. As it is, it is probably one of the *last* reference sources to use ...

There are two pages of introduction. They advise that this implementation is fig-Forth (one of the standard versions of Forth) plus special extensions that make it compatible with PET-FORTH and the Vic. A few of the major departures are listed together with a catalogue of error messages.

The remaining pages contain a straight listing of the system dictionary with descriptions and stack diagrams.

There are some interesting typographical happenings that make it more difficult to read than was presumably intended. (Can the word 'och' which appears at the least three times be the Swedish for 'and'? My knowledge goes only as far as the Danish, which is 'og'.) And the stack diagram for the multiplication fraction [*] reads:

*** n1 n2 ... n2**

... where I am sure that the last n2 should be n3, being the product of n1 and n2.

Missing from the manual is a memory map and instructions on how to use the editor.

To take these in turn: the Vic-Forth cartridge will operate with any memory configuration. The video RAM is at $1000; beyond this you are left to explore for yourself.

The [DUMP] command displays in a row of four bytes and hex values contained between two memory addresses. Using this I discovered that most of the zero-page memory is truly zero, even down to the memory pointers at $2B et seq. $281 – $284 are however present. Apparently cold start is at $B000.

In fact I had to remove my VICKIT ROM chip (which also sits at this location) before I could get the cartridge to work with the expanded Vic. When this was done I was happy to discover that 19K was available to me for Forth programming.

It appears that it is necessary to know what RAM is available, since the system does not warn when the dictionary is full: presumably it crashes. Hence ...

: ?FRE 644 C0 256 * HERE –.;

... which entered first will give free RAM in bytes.

With the information that the cartridge comes with 3K expansion RAM for the $0400-$1000 slot, my tentative memory map is as follows.

Contents	Address
	0000
Some zero-page used >$60	
	0100
System stack and work areas	
	0400
3K expansion system and user variable	
	1000
Video RAM	
	1200
General work area and user RAM for dictionary extensions	
	9000
VIC chip etc	
	A000
	B000
Forth ROM	
	C000
Basic ROM – not available	
	E000
KERNAL ROM	
	FFFF

The editor is not present in the ROM. It is supplied as a loose-leaf addendum to the manual in Forth screen format. It comprises some half-dozen screens of source code.

There is an innate problem here, given no disk drive, of a chicken-and-egg nature. To use the screen format and insert source code on to the various screens the [PUT] command is required. This is part of the editor. But the editor is the source code to be inserted ... It took me days to come to terms with this! The solution is to enter the editor word for word in the direct mode.

A further problem appears to be the length of some of the definitions. For instance, [WHERE] needs to be broken down into more than one part. The length of a definition in the direct mode cannot be more than about 70 characters from : to ;.

Having entered the editor it may be stored on tape with the [CSAVE] command. This saves all the Dictionary entries, presumably as object code. The editor should make it relatively easy to enter any source code and compile it into the dictionary. But again without a disk drive this task is made very difficult.

Forth screens are usually held in storage on disk and are transferred to the disk buffers in RAM for access by the [LIST] commands as required. Although after producing plenty of disk error messages I could clear a screen for editing and enter code on to it, it nearly always failed to [LOAD]. Thus I was forced to enter code directly, which makes program writing very tiresome. Although the dictionary can be examined by the [VLIST] command there is no way to tell if definitions have been entered correctly.

My lack of disk drive was the greatest hinderance I found in using this cartridge.

The screen is a standard Vic display, 22 by 23, and scrolls up in the normal manner. No conces-

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sion has been made to the Forth standard 64x6 format, except when a block (screen) is viewed by the editor.

The editor contains two splendid words. [VIEW] takes the screen number as a parameter and selects it for editing: by using the cursor keys to position the cursor on the desired line and pressing RETURN, that line is displayed for editing.

[X] is similar, but uses the current value of [SCR] as a parameter – which means it operates with the current screen only.

The beginner is going to do two things in quick succession. First, you'll get an error message: then you will cause a system crash. Error messages are displayed as a number with an explanation of the code in the manual.

I managed to summon quite a few of these while finding my way through sundry operations. But I was particularly confused by error message # 0 which is not listed in the manual at all: I can only assume that it means "?"! I obtained message # 11, too, which also has no explanation.

System crashes occur frequently when the user has insufficient understanding of Forth. It is relatively easy to isolate the offending word or definition and change it. Stack over- or underflow can cause problems: and the words [DEPTH] and [S], which display the depth and values of the stack respectively, can be useful. Sadly Vic-Forth supports neither of these, so here they are:

:depth (-- n) sp@ 136 swap – 2 / ;

: .s cr depth if sp@ 2 – 134 do i @ . –2 + loop else . "stack empty" then;

Together with the editor listing is one for an Assembler, supporting what appears to be the usual 6602 instruction set. I have up trying to enter it after several hours of daunting effort: without full editing and storage facilities (on disk) it is a thankless task. Similarly my attempt at entering a game met with the same end as well as dispiriting me.

In conclusion

The result of this, not having a resident editor and the problems encountered in storing code, is to make this particular implementation very difficult for a beginner to use. I am *not* a complete beginner: and I experienced such difficulties as I have described. Too much knowledge of Forth systems is assumed.

You will also be severely restricted by lack of disk drive, and therefore this cartridge cannot be recommended if one is not available. Which is a shame, since most Vic owners will probably not own a disk drive.

So unless the user is tenacious, perspicacious, willing to read lots of books, dedicated to Forth, or all of these and more, he will soon lose heart. On the other hand with some knowledge of Forth, he or she will soon be at home with this implementation.

Pricewise £38.95 is tediously high. But if you have spent hundreds on a disk drive what is a mere £39? Actually if other machines can support Forth implementations at the RRP of some £15, then £39 is still excessive – notwithstanding the 3K RAM you get. (This is a problem generic to the market and to many Commodore products specifically.)

So, if you are well into Forth already Vic-Forth has much to recommend it. I would suggest that it makes a good effort at implementing a full fig-Forth system.

Casual experimenters? Steer clear. Much as I enjoy Forth it is with regret that I say this. I feel that an opportunity has been lost to introduce this fascinating language to home users.

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Word Processing

Wordcraft tips

Getting more from Vic WP

by Mike Apsey

Familiarity with any word processing system brings certain operating procedure discoveries and pitfalls not covered in program documentation. The operation of Wordcraft–20 (or 40) is no exception. Here is a brief collection of things I have found helpful in manipulation of Wordcraft text.

Page jumping

Although it is not clear in documentation, the sequence CBM P may be followed by either a (HOME), (CLEAR), or a page number, to move to either the home position, end of text, or specified page in that order.

Remember that page numbers greater than nine must be called by enclosing the number in parenthesis. Thus, the command CBM P (25) would move to page 25, if that page exists. Forgetting the parenthesis moves to page two.

Insertions

Although the INSERT mode will continue opening space, it is possible to cursor out of the INSERT space and command some format change, disengaging the AUTO-INSERT function.

When INSERTing, try to stay with the task instead of jumping around. If it is necessary to move from your insertion space to other text areas, be aware that upon returning, additional space may not open when the allocated space is used up, and you will begin over-typing.

Twin single disks

If more than one disk is used, and the second drive has been hardware changed to number nine, the second drive may be called by entering D,1 on the command line. To return to drive eight, enter **D,0**.

Filenames

Spaces and characters that are not alphabetic or numeric (including asterisk, backslash, and hyphen) will be rejected with ?FILENAME NOT VALID. Should you find your own filename invalid, check for occurrences of these, and omit them from your subsequent filename attempts.

The asterisk cannot be used as a 'wild card' in file loads. Instead, the directory should be called and the full name used.

Headings/Footings

Although automatic headings and footings are not implemented, if you find them necessary begin or end each page with a single line containing "HD" or "FT" (header or footer); then use the global search/replace option to find and change them before printing.

Printer tricks

To make your printer do tricks, try adding 128 to the value of the number to be sent in the escape sequence if you are using a CARD PRINT. These values follow "A," from the COMMAND mode, and always begin with "27" (which is the escape code, telling the printer not to print the character(s) that follow). If your printer needs two numbers – as in the case of margins, etc – just add the additional character values with commas between.

Embedded printer commands

Printer commands are displayed as reverse field characters. If you have forgotten what a command is, enter CBM C; and as you move from line to line, the embedded commands will be displayed on the COMMAND line.

If you are somehow hopelessly lost as to how to remove something, delete the line, and re-enter it. I recommend this procedure if you have repeated tabs or other problems difficult to sort out.

Double-spacing

Although undocumented in the Wordcraft manual, double-spacing is possible if the command **P,,D** is used.

Changing paper types

You may change from continuous to hand-fed paper without exiting Wordcraft by entering a **,,C** for continuous, **,,H** for hand-fed.

Page numbering

Like the above, page numbers can be similarly added but the consecutive numbering must be inserted by hand. To number pages, let Wordcraft break your pages for you; and at the beginning (or end) of each page, insert the line to contain the number and tab to the position (or centre the number, or begin on the left). Number your pages as the last operation before printing.

Caution

Under no circumstances should the power status of a peripheral be altered while using Wordcraft as it will likely result in a lock-up. Instead, if you have entered significant text without having remembered to turn on the disk or printer, save your text to cassette before proceeding. It's a good idea to have the cassette connected at all times for such emergencies.

Centering

If the line you wish to centre is longer than the video display chosen, only the words appearing on the line containing the command will centre. For this reason, toggle to a width greater than the width of the line to be centred with the "W" command before centering, then back. When your document is printed, the chosen line will be properly centred.

How to type in Victuals

How we reproduce listings

We usually put our listings for Victuals and other programs through a code conversion program that replaces the hieroglyphic Commodore colour and screen control symbols with a more meaningful set of commands.

When you see...	It means ...	And you ...
[CUP]	*cursor up*	press the 'cursor up' key (shifted)
[CUD]	*cursor down*	press the 'cursor down' key
[CUL]	*cursor left*	press the 'cursor left' key (shifted)
[CUR]	*cursor right*	press the 'cursor right' key
[HOM]	*cursor to the top lefthand corner*	press the HOME key
[CLR]	*clear*	press the CLR key (shifted)
[INS]	*insert*	press the INSert key (shifted)
[BLK]	*change to black*	press the BLK key (CTRL and 1)
[WHT]	*change to white*	press the WHT key (CTRL and 2)
[RED]	*change to red*	press the RED key (CTRL and 3)
[CYN]	*change to cyan*	press the CYN key (CTRL and 4)
[PUR]	*change to purple*	press the PUR key (CTRL and 5)
[GRN]	*change to green*	press the GRN key (CTRL and 6)
[BLU]	*change to blue*	press the BLU key (CTRL and 7)
[YEL]	*change to yellow*	press the YEL key (CTRL and 8)
[RVS]	*reverse on*	press the RVS ON key (CTRL and 9)
[RVO]	*reverse off*	press the RVS OFF key (CTRL and 0)
[SPC]	*space*	press the space bar; repeat the specified number of times

We have two methods of presenting listings. When we can, we run them through a converter program that replaces the hieroglyphic control codes with more meaningful symbols.

These listings we generally run out on a letter-quality printer, though, and conventional graphics can't be handled on a daisywheel. So some listings are done on a Commodore printer, in which case you may see the standard control codes:

```
CLR            ...  ■  (REVERSED HEART)
HOME           ...  ■  (REVERSED S)
RVS ON         ...  ■  (REVERSED R)
RVS OFF        ...  ■  (REVERSED UNDERSCORE)
CURSOR UP      ...  □  (REVERSED SHIFTED ●)
CURSOR DOWN    ...  ■  (REVERSED Q)
CURSOR LEFT    ...  ■ (REVERSED UPWARD BAR - SHIFTED H)
CURSOR RIGHT   ...  ■ (REVERSED LEFT SQUARE BRACKET)

SET COLOUR TO
          BLACK  ...  ■  (REVERSED SHIFTED P)
          WHITE  ...  ■  (REVERSED E)
          RED     ... ■  (REVERSED £)
          CYAN   ...  ■  (REVERSED COMMODORE-SHIFTED ●)
          PURPLE ...  ■  (REVERSED COMMODORE-SHIFTED -)
          GREEN  ...  ■  (REVERSED UP ARROW)
          BLUE   ...  ■  (REVERSED LEFT ARROW)
          YELLOW ...  ■  (REVERSED PI SIGN)
THE FUNCTION KEYS CAN BE INCORPORATED INTO PRINT STATEMENTS TOO.
AS WITH THE OTHER NON-ALPHANUMERIC KEYS, THEY APPEAR AS SPECIAL"

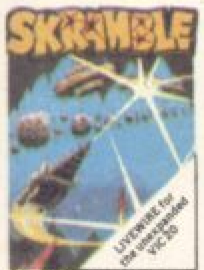
SYMBOLS IN A LISTING
F1   ... ■                      F2   ... ■
F3   ... ■                      F4   ... ■
F5   ... ■                      F6   ... ■
F7   ... ■                      F8   ... ■
```

robustness and reliability were excellent... a really good feel to the action... a pleasure to use... not one game failed to load... nice professional ... I like it... very impressed

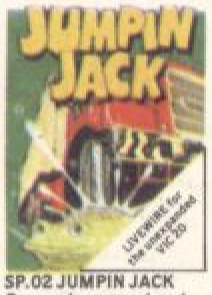
EXTRACTS: J.D. COLLINS
GIANT TEST VIC COMPUTING
(Vol. 2 Issue 5 June, '83)

DON'T JUST TAKE OUR WORD FOR IT!

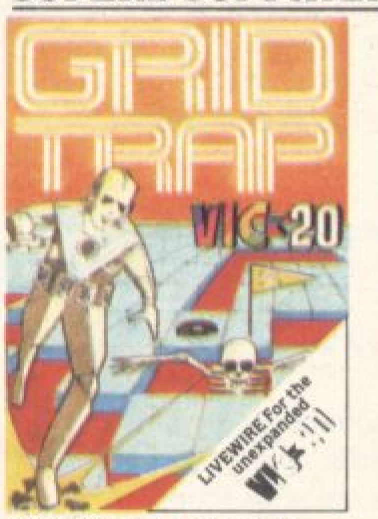
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SP.01 SKRAMBLE Destroy the enemy installations and missiles in their underground silo. Joystick or keyboard. M/code. **£7.95**



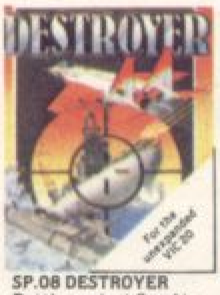
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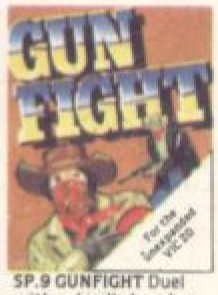
SP.04 GRIDTRAP Your man has been placed on a grid of traps which open after he walks over them. Defuse the time bombs in less than 60 seconds. Further hazards are presented by a series of mines scattered around the grid which cannot be walked on and a wandering 'BOOT' which must be avoided. The more you play this one the harder it gets, bonus life 100,000 points. Programmed in Machine Code. Hi-res Colour Graphics and novel musical sound effects. Joystick or keyboard control. **£7.95**



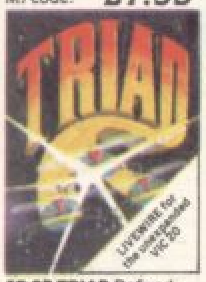
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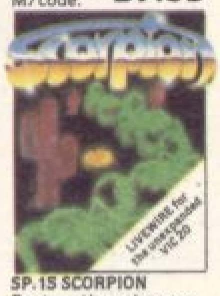
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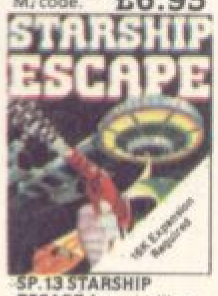
SP.03 TRIAD Defend your base against the suicide fleets of alien hoverships. Joysticks or keyboard. M/code. **£7.95**



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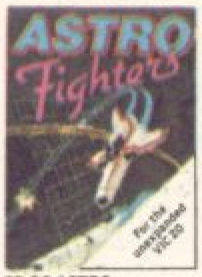
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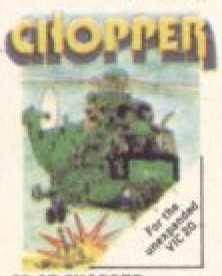
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64



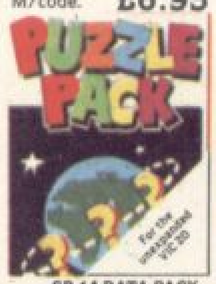
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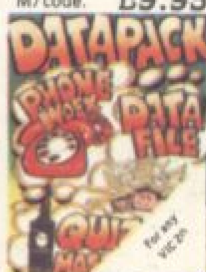
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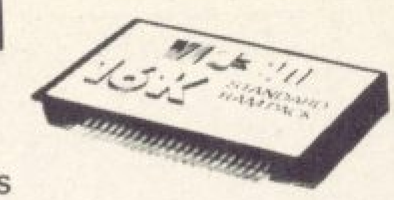
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Home Computer Centre

C.U.

Wordsearch

by Keith Edward

Wordsearch will only run on the unexpanded Vic-20. The computer hides up to a maximum of 30 words in a 20 x 21 matrix. The words are hidden at random either vertically, horizontally or diaginally and either forwards or backwards.

The maximum length of each word is 18 letters. A routine is included, check this and that words contain letters only.

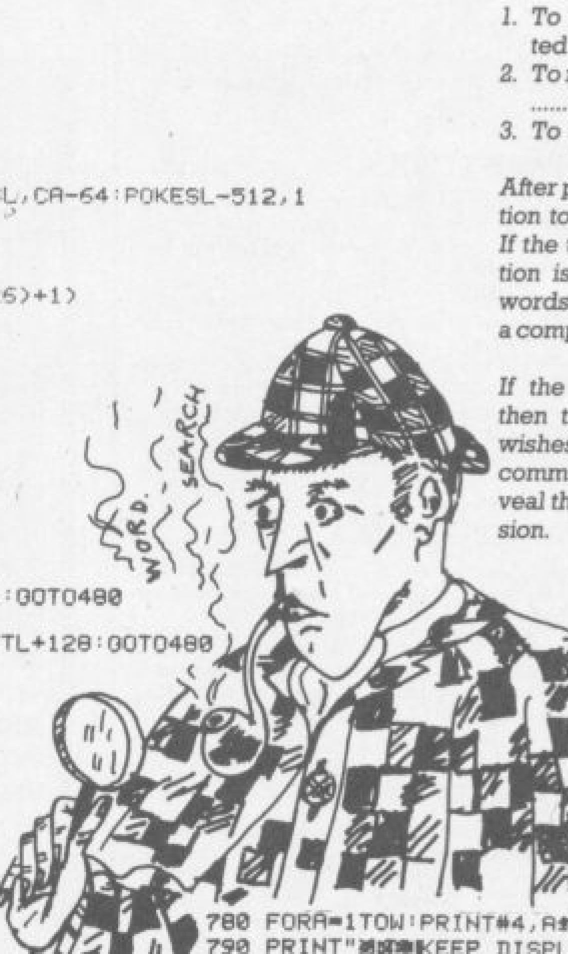
The option is then given to obtain a printed copy of the word square. If the printer is not available the game can be played on the Vic screen. Each word, as it is found, can be high-lighted in reverse field. This is achieved by moving the cursor over each letter of the word in turn and then pressing the return key in order to highlight it. The cursor is moved by using the normal cursor movement keys. The other commands which may be used in this section are:-

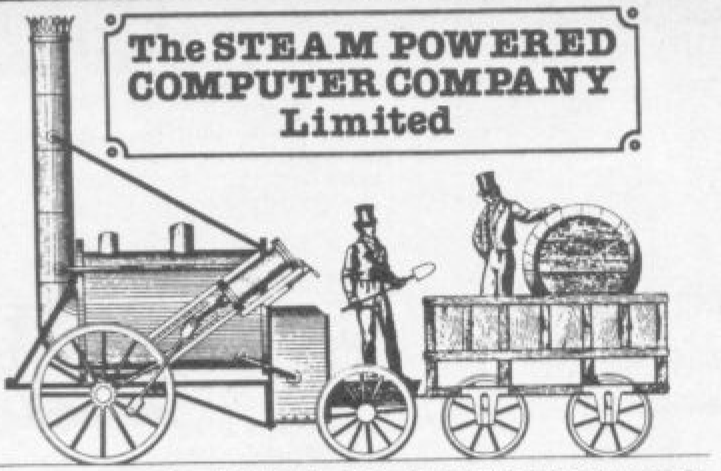
1. *To rub out a wrongly highlighted letter .... Press R*
2. *To reveal the solution (give up) .... Press G*
3. *To quit this section ..... Press Q*

After pressing either G or Q the option to have 'Another Go' is given. If the user answers Y then the option is offered to keep the same words and have them re-hidden in a completely different matrix.

If the printer option is selected then the user is asked if he/she wishes to keep the display. The command G can then be used to reveal the solution to the printed version.

```
10 POKE51,255:POKE52,27:POKE55,255:POKE56,27:GOSUB840:POKE36878,15:A=RND(-TI)
20 POKE36879,27:PRINT"{CLR}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}      WORDSEARCH
30 PRINT"{DOWN}{DOWN}{DOWN}{DOWN}"TAB(10)"BY
40 PRINT"{DOWN}{DOWN}{DOWN}{DOWN}    KEITH  EDWARDS
50 FORI=7680TO8185
60 IFPEEK(I)=32THENPOKEI,INT(RND(1)*26)+1:GOTO80
70 POKEI-512,1
80 POKEI+30720,0:NEXT:GOSUB850:FORI=1TO1000:NEXT
90 DIMA$(30):CT=7680:TC=38400:PRINT"{CLR}";
100 INPUT"{HOME}{DOWN}HOW MANY WORDS";W$
110 W=VAL(W$):IFW<=0THENPRINT"{DOWN}DIFFICULT!{DOWN}":GOTO100
120 IFW>30THENPRINT"{DOWN}30 MAXIMUM, PLEASE.{DOWN}":GOTO100
130 FORA=1TOW
140 PRINT"{DOWN}WORD"A"={DOWN}":INPUTA$(A)
150 IFLEN(A$(A))>18THENPRINT"{DOWN}TOO MANY LETTERS!{DOWN}{DOWN}120 MAXIMUM PLEASE.":GOTO140
160 FORI=1TOLEN(A$(A))
170 IFMID$(A$(A),I,1)<"A"ORMID$(A$(A),I,1)>"Z"THENPRINT"{DOWN}LETTERS ONLY PLEASE!":G
OTO140
180 NEXT:NEXT
190 GOSUB840
200 PRINT"{CLR} PRINTED COPY ? (Y/N)
210 PF=0:GETGT$:IFGT$=""THEN210
220 IFGT$="Y"THENPF=1:GOTO240
230 IFGT$<>"N"THEN210
240 PRINT"{CLR}":POKE36879,11:FORI=0TO21:POKETC+I,3:POKECT+I,160:POKETC+I+484,3:POKE
CT+I+484,160:NEXT
250 FORI=0TO22:POKETC+22*I,3:POKECT+22*I,160:POKETC+22*I+21,3:POKECT+22*I+21,160
:NEXT
260 FORJ=1TOW
270 SL=INT(RND(1)*506)+CT:SN=SL
280 DX=INT(RND(1)*3)-1
290 DY=(INT(RND(1)*3)-1)*22
300 IFDX=0ANDDY=0THEN280
310 FORA=1TOLEN(A$(J))
320 IFPEEK(SN)=32THEN340
330 IFPEEK(SN)<>ASC(MID$(A$(J),A,1))-64THEN270
340 SN=SN+DX+DY:NEXT
350 FORI=1TOLEN(A$(J))
360 CA=ASC(MID$(A$(J),I,1))
370 POKE36875,INT(RND(1)*128+128):POKESL+30720,0:POKESL,CA-64:POKESL-512,1
380 SL=SL+DX+DY
390 POKE36875,0:NEXTI,J
400 FORI=7703TO8162
410 IFPEEK(I)=32THEN:POKEI+30720,0:POKEI,(INT(RND(1)*26)+1)
420 POKE36875,((I-7703)/4)+128:NEXT
430 POKE36875,0:POKE36879,27
440 IFPF=1THEN730
450 CP=7703:X=0
460 IFPEEK(CP+X)=160THENPOKECP,TL:GOSUB710:GOTO480
470 CP=CP+X:TL=PEEK(CP):IFTL<27THENPOKECP,TL+128
480 GETZ$:IFZ$=""THEN480
490 IFZ$="{DOWN}"THENPOKECP,TL:X=22:GOTO460
500 IFZ$="{UP}"THENPOKECP,TL:X=-22:GOTO460
510 IFZ$="{LEFT}"THENPOKECP,TL:X=-1:GOTO460
520 IFZ$="{RIGHT}"THENPOKECP,TL:X=+1:GOTO460
530 IFZ$=CHR$(13)THENTL=TL+128:GOSUB690:POKECP+30720,4:GOTO480
540 IFZ$="G"THEN580
550 IFZ$="R"THENTL=TL-128:POKECP+30720,0:IFTL<1THENTL=TL+128:GOTO480
560 IFZ$="Q"THEN590
570 GOTO480
580 POKECP,PEEK(CP)-128:POKECP+30720,0:GOSUB850
590 PRINT"{DOWN}{DOWN}{DOWN}  ANOTHER GO ? (Y/N)
600 GETGT$:IFGT$=""THEN600
610 IFGT$="Y"THEN640
620 IFGT$<>"N"THEN600
630 PRINT"{CLR}{DOWN}":END
640 PRINT"{DOWN}{DOWN}{DOWN}  SAME WORDS ? (Y/N)
650 GETGT$:IFGT$=""THEN650
660 IFGT$="Y"THEN190
670 IFGT$<>"N"THEN650
680 RUN90
690 IFTL>255THENTL=TL-128
700 RETURN
710 IFTL<128THENPOKECP,TL+128
720 RETURN
730 OPEN4,4:PRINT#4,CHR$(14)"      WORDSEARCH":PRINT#4
740 FORR=1TO21:PW$="":FORC=1TO20
750 PW$=PW$+CHR$(PEEK(CT+C+22*R)+64)+" "
760 NEXTC:PRINT#4,CHR$(15)PW$:NEXTR
770 PRINT#4:PRINT#4,"TRY TO FIND THESE HIDDEN WORDS:-":PRINT#4
780 FORA=1TOW:PRINT#4,A$(A):NEXT:CLOSE4
790 PRINT"{DOWN}{DOWN}{DOWN}KEEP DISPLAY ? (Y/N)
800 GETGT$:IFGT$=""THEN790
810 IFGT$="Y"THENPRINT"{DOWN}{DOWN}{DOWN}          ":GOTO450
820 IFGT$<>"N"THEN790
830 GOTO590
840 FORI=7191TO7650:POKEI,0:NEXT:RETURN
850 FORI=7191TO7650
860 Q=PEEK(I+512)+128
870 IFQ>255THENQ=Q-128
880 IFPEEK(I)=1THENPOKEI+512,Q
890 NEXT:RETURN
```





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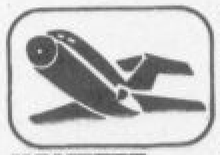
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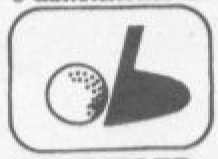
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Tape Index

by Richard Harper

A useful utility from Richard Harper which allows you to SAVE up to nine programs on to a C60 cassette tape and – more importantly – to find them again, quickly. It does this by using the Vic's internal clock to time a fast-forward wind on the cassette deck, and will switch off the motor automatically when the correct position has been reached.

The program should be SAVEd at the start of each tape and can then be LOADed and RUN each time the cassette is used.

Neither the well-displayed prompts nor Richard's accompanying instructions tell us how to find the right place to SAVE each subsequent program, and that would be a useful module to add. We ran the program and asked it to FF to the beginning of the first program. Then, instead of pressing PLAY as instructed, we pressed RUN/STOP and RESTORE to stop the program. LOADed the appropriate new program into memory and then SAVEd it on the already would-on cassette – a rather laborious procedure which we're sure could be done more elegantly under program control.

The timing is controlled by the values set for L(X) in lines 1 to 9 at the beginning. The values in the LISTing will format a C60 tape to take nine programs of approximately 8K maximum length. They could be changed to allow for longer or shorter programs.

The index to program names should be written into the DATA statements at the end of the listing. Since no significant change is made to the program length, this can be done as each program is SAVEd.

```
1 L(1)= 150
2 L(2)= 924
3 L(3)= 1643
4 L(4)= 2310
5 L(5)= 2930
6 L(6)= 3505
7 L(7)= 4039
8 L(8)= 4535
9 L(9)= 4995
50 S=7680: IFPEEK(44)=18THENS=4096
60 POKE 36878,15: POKE 36879,221
70 M$="[HOM]": FORA=1TO17: M$=M$+"[CUD]": NEXT
80 S$="[CUP][CUR]"
90 PRINT "[CLR][RED][CUD][CUR]INDEX": PRINT "@@@@@@@"
100 PRINT "[BLK][CUD]PROGRAMSONTHISTAPE[CUD]"
110 FORA=1TO9: READP$: PRINT A; P$: NEXT
120 PRINT M$"[BLU]SELECT1TO9": POKE 198,0
130 GETA$: IFVAL(A$)<1THEN130
140 L=VAL(A$): RESTORE: FORA=1TOL: READP$: NEXT:
150 PRINT M$"[BLK][CUD][CUD]"S$P$"SELECTED": POKE S+110+22*L,42
160 GOSUB500: IF(PEEK(37151)AND64)=0THENGOSUB800
170 PRINT M$"[BLU]PRESSF/FWDONTAPE": WAIT37151,64,64: POKE 198,0
180 PRINT M$"[RED]PRESS[RVS]S[RVO]TOSEARCH": GETA$: IFA$=""THEN180
190 IFVAL(A$)>0THENPOKE S+110+22*L,32: GOTO140
200 IFA$<>"S"THEN180
210 GOSUB600: PRINT M$"[RED]SEARCHING"
220 IFT1+L(L)>TITHENPRINT "[HOM][BLK]"T1+L(L)-TI"[CUL]": GOTO220
230 PRINT "[HOM]0": GOSUB500: GOSUB800
240 PRINT M$"[CUD][CUD][CUD][CUD]LOAD"
260 POKE 198,4
270 POKE 631,145: POKE 632,145: POKE 633,145: POKE 634,13
280 END
500 POKE 37148,PEEK(3748)AND16: RETURN
600 POKE 37148,PEEK(37148)OR15: T1=TI: RETURN
700 FOR A=1TO10: POKE36875,200:
    POKE36876,200: NEXT: POKE36875,0:
    POKE36876,0: RETURN
800 PRINTM$"[RED][RVS] PRESS STOP ON
    TAPE  ": GOSUB700: WAIT37151,64:
    RETURN
900 DATAPROGRAM ONE
910 DATAPROGRAM TWO
920 DATAPROGRAM THREE
930 DATAPROGRAM FOUR
940 DATAPROGRAM FIVE
950 DATAPROGRAM SIX
960 DATAPROGRAM SEVEN
970 DATAPROGRAM EIGHT
980 DATAPROGRAM NINE
```



Victuals

SHRINK

by Ian Creasey

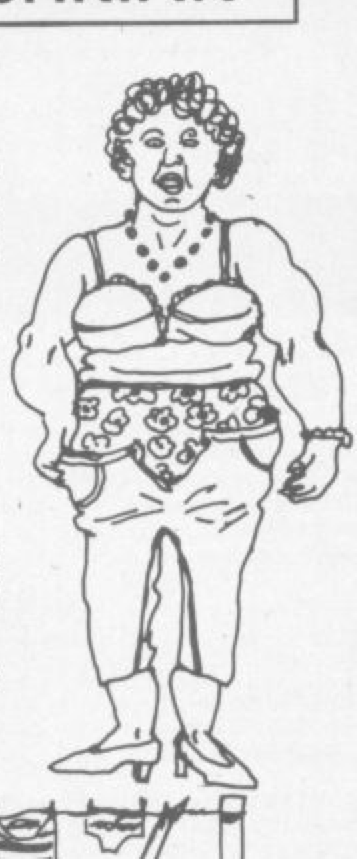
This handy little program will shrink your Basic program by removing all spaces and all REM statements. It takes up to 256 bytes at the top of memory.

To use it, type SYS7424. To destroy the program and reclaim the 256 bytes, type POKE56,30:CLR.

It will work only on an unexpanded or a 3K expanded Vic.

It is advisable to SAVE the program before RUNning it, as one error in the machine-code data will probably cause the Vic to crash ...

SHRINK originally appeared in Ian's book Vic-20 Mindstretchers.





```
   5 REM *** SHRINK ***
  10 POKE56,29:CLR:FORI=7424TO7646:READJ:POKE
     I,J:NEXT
1000 DATA165,43,133,193,165,44,133,194,160,0,
     152,24,101,193,133,193
1010 DATA144,2,230,194,160,0,177,193,208,33,2
     00,177,193,208,28,32
1020 DATA51,197,169,67,141,119,2,169,76,141,1
     20,2,169,82,141,121
1030 DATA2,169,13,141,122,2,169,4,133,198,96,
     32,51,197,169,0
1040 DATA133,0,160,4,177,193,201,143,208,42,1
     60,0,177,193,133,172
1050 DATA200,177,193,133,173,160,0,177,172,13
     3,174,200,177,172,133,175
1060 DATA160,0,32,170,29,177,193,197,174,208,
     245,200,177,193,197,175
1070 DATA208,238,240,160,200,177,193,208,3,20
     0,208,142,201,34,208,6
1080 DATA165,0,73,255,133,0,166,0,208,234,201
     ,32,208,6,32,170
1090 DATA29,24,144,225,201,143,208,220,136,15
     2,170,177,193,240,7,169
1100 DATA32,145,193,200,208,245,138,168,208,2
     03,198,45,165,45,201,255
1110 DATA208,2,198,46,165,194,133,2,152,170,2
     4,101,193,133,1,144
1120 DATA2,230,2,160,1,177,1,136,145,1,230,1,
     208,2,230,2
1130 DATA165,1,197,45,208,237,165,2,197,46,20
     8,231,138,168,96
     READY.
```


Meet Slurpy
Slurpy has the biggest appetite in the world! He spends his day slurping tasty snacks such as Glowbugs and Widowmaker spiders. Greedy Slurpy may even slurp poisonous creatures which he must immediately spit out again.
To his enemies, Slurpy's plump little body is a delicious titbit. He must continually be on the look out as he slurps from cave to cave where he encounters earthquakes, whirlwinds and phantoms. Help Slurpy eat his fill before something eats him!
Slurpy is an amazing fun game. Superb graphics, colour and sound really bring Slurpy to life. The game comes with an eight page scenario and a free poster offer. You can find Slurpy in all major software retailers.
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SCREEN SCENE

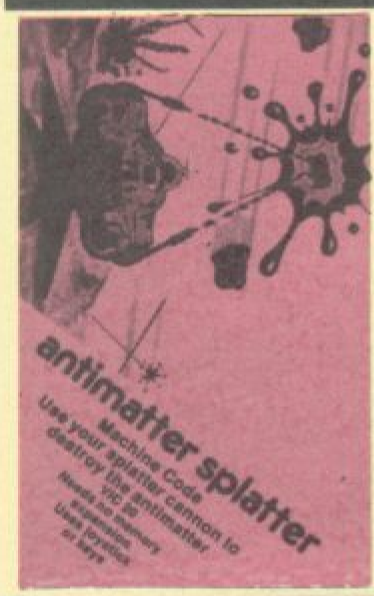
ANTIMATTER SPLATTER
Vic 20 (Unexpanded)
Joystick or keyboard
Price, £3.99

Entirely unprovoked, a sullen black alien is casting deadly capsules earthwards. The cannisters of doom roll along a series of variously coloured shifting plates, finding egress at apertures across the width of the screen. Your cannon is consequently darting everywhere to nullify the anitmatter. Each miss, by you, means fewer human survivors and one more hole in the shuffling seive overhead. It's not too long before the drizzle of antimatter has turned into a torrent – that's when you'll want to turn the repetative sound effects down.

Bright and breezy graphics; fast action; good use of 3.5K. Not at all bad. *LS*

Bubble Bus

Presentation:	■■■□□
Skill level:	■■□□□
Interest:	■■□□□
Value for money:	■■■■□



CATCHA TROOPA
Vic-20 (Unexpanded)
Joystick only
Price £7.50

There are several 'catching' games on the market. In this example you are trying to collect paratroopers (they're bailing out from a helicopter) in your rowing boat before they hit the wafer. Of course they don't fall in straight lines – gusty winds interfere. And waiting below is a hungry shark ready to open his jaws. Once in the drink, a soldier can still be saved from the ravenous fish if you are quick and accurate enough in casting overboard your rope ladder.



Not a blockbuster, but the graphics are fair enough and so are the sound effects. All in all more than presentable and well worth considering if the scenario appeals to you. *LS*

Abrasco

Presentation:	■■■□□
Skill level:	■■■□□
Interest:	■■■□□
Value for money:	■■■□□

CHOCABLOC
Vic 20 (+8K)
Keyboard or Joystick
Price £6.50

In my 'umble opinion this program is jolly spiffing on three counts: its actual concept, the graphics (loved the meanies), and the sound. Possibly described as a thinking man's (sorry, person's) Pacman, with a maze that is movable by you and munched at by the meanies.

The ice-blocks, which constitute the maze's fabric, can be pushed to crush the 'Chocbeez', your mean opponents. Choc eggs are hatching in space while you are listening to real cool music played on the organ. Of course it's best if you can eliminate the nasties before they hatch. At the same time as avoiding the still active enemy you are expected to align three Choc-bars sequestered amongst the ice-store for a bonus score. So there's three tasks to perform more or less simultaneously.

The multi-colour graphics give an attractive display overall on a vertically-stretched black screen, allowing for full instrumentation at the foot. The insert instructions are exemplary; even the cassette illustration depicts what actually happens! A plausible, nightmarish, original scenario and a very playable helping of fun which should appeal to all devotees of arcade games.

Progressively more difficult screens, of course, with a change of hue for the meanies and a high-score table. But beware – it's a very challenging opponent.

Well done Paramount: more power to your elbow! *LS*

Paramount

Presentation:	■■■■■
Skill level:	■■■■■
Interest:	■■■■□
Value for money:	■■■■□



COUNTDOWN
Vic 20 (+8K or +16K – two versions)
Keyboard or Joystick
Price £5.50

An aptly-named opus from Paramount. In effect you have to guide our hero through three different mazes with sufficient alacrity to diffuse a time-bomb. In the first, you will need to collect keys to pass through the barred gates, picking up points in the form of gold blocks on the way. Of course there are hazards in the shape of sentry posts, which fire bullets and intermittent electric arcs.

Having negotiated the brickwork halls and reached the portal at the top of the screen you drop into a verdant jungle – another key to collect, lianas to climb, falling coconuts and carniverous plants to avoid. Optically attractive, but with no time to linger, for you still have to negotiate the dark sewers! Still collecting treasure, four more keys have to be acquired to diffuse the bomb. Apart from your clock ticking away, hanging tendrils pose a problem – but you know you will succeed (well, perhaps next time round).

I have not seen a game quite like this; altogether original and most compelling. Colourful, certainly, though with no surprises in the sonics. On-screen instructions are provided if needed for novices. With its choice of the three different time limits and Hall of Fame too this is altogether a well presented program. *LS*

Paramount

Presentation:	■■■■□
Skill level:	■■■□□
Interest:	■■■■□
Value for money:	■■■■■

EXTERMINATOR
Vic 20 (Unexpanded)
Joystick or keyboard
Price, £3.99

Another scion of *Centipede*, grafted on to 3.5K to produce a viable new variety. A cyan snake (alternatively worm or centipede, whatever grabs you) squirms between the yellow cacti along with an army of motley would-be miscreants. An eagle, which could have a soupçon more intelligence, hounds and distracts your rapid repeater gun which by now should be wreaking havoc amongst the desert population.

The background changes colour after a successful round of exterminating thus adding a touch of diversity. This action is adequately backed up by the sonics, with no gratuitous audio enhancements apart from an opening fanfare.

Overall a decent rendering of a favourite game – compeiant graphics with compatible sound



and plenty to shoot at! I liked it. *LS*

Bubble Bus

Presentation:	■■■□□
Skill level:	■■■□□
Interest:	■■■□□
Value for money:	■■■■□

FLY SNATCHER
Vic-20 (Unexpanded)
Joystick or Keyboard
Price £7.50

Being a spider it is your wont to scour the bushes for juicy flies. These are thoughtfully (if randomly) provided by our friendly Vic. A ravenous weasel pursues you with rather greater powers of locomotion than is at your disposal: recalling your tuition in ergonomics you mop up the flies using a tactical route to avoid interception. Success leads to another helping of flies power-driven into position by uncompromising sonics. It's even worth being caught, as eventually you will be as the pace hots up: you can watch the weasel chomping away at your own body!

I should like to see an expanded screen version, also a more sophisticated variant for the 64. There is obviously room for the player to develop expertise and enhanced graphics would be beneficial. *LS*

Abrasco

Presentation:	■■■□□
Skill level:	■■■□□
Interest:	■■■□□
Value for money:	■■■□□



JOGGER
Vic 20 (Any)
Joystick only
Price £5.50

You've guessed it, the evergreen *Frogger* in the guise of the fun-figure of the eighties. In your quest to reach the other side, the usual hazards, (commensurate with 3.5K) have to be avoided. Multi-colour mode is employed with much use of orange, giving an attractive display; but of course there isn't much time to admire the view.

A bonus 'flash' is the only distinction between crocs and logs; otherwise the graphics are fine. Speaking of crocs, their jaws will occasionally bar access to your homing bay; c'est la Vie. While you are trying to cope with the accelerating pace, background music is provided with no less than three recognisable ditties – the programmer must be a musician.

A pre-mission briefing is included on the insert, but we should know *Frogger* by now.

For the sake of critical appraisal, I have docked a point in the value-for-money stakes as only one copy is provided. The very approachable Paramount does however assure me that every single tape is tested before despatch.

My advice? Well, you might prefer to do your jogging in front of the TV in future. *LS*

Paramount

Presentation:	■■■□□
Skill level:	■■■□□
Interest:	■■■□□
Value for money:	■■■□□

METER MANIA
Vic-20 (Unexpanded)
Joystick or Keyboard
Price £7.50

I was utterly nonplussed by the graphic effects on this game, the like of which I have never witnessed on a Vic before. Eventually it dawned on me: the program appeared to be utilising two screens alternating very rapidly to give a sprite-like effect (some reader will doubtless correct me!). Anyway, it has to be seen to be believed.

The game itself is after the style of the celebrated *Pacman*, with traffic wardens (nice people really – back in five minutes) acting as the



nasties and you collecting coins to feed the meter – against the clock, naturally. You may find temporary refuge in your parked car within the maze of streets and houses.

Altogether a pleasing game with the advantage of selectable screen and border colours: bravo, Abrasco. *LS*

Abrasco

Presentation:	■■■■■
Skill level:	■■■■□
Interest:	■■■■□
Value for money:	■■■■□

VIXPLODE
Vic-20 (Unexpanded)
Keyboard only
Price £8.50

Great to see a new board game designed especially for our magic micros; there is a dearth of 'serious' games in the plethora of arcade extravaganzas. Vaguely reminiscent of *Othello*, but definitely original and to be applauded as such: after digesting the helpful on-screen introductory crash course, you are presented with a 6x6 matrix in which each square can have two, three or four adjacent neighbours – by incrementing the value of his strategically—placed counters the player gets to capture adjacent squares when the counter matches the total needed. Of course the computer is doing the selfsame thing – life is never easy. Chain reactions occur, which adds to the fascination of this brain teaser. The blurb states that its difficult to beat at Level Four – you'd better believe it!

A remark about the value rating. You're not getting screens full of hi-res graphics; but the author is entitled to a fair return for his innovation. It deserves to be in everyone's collection. *LS*

Abrasco

Presentation:	■■■■□
Skill level:	■■■■■
Interest:	■■■■■
Value for money:	■■■■□

THE GOLDEN APPLES OF ZEUS
Vic-20 (+8K)
Keyboard only
Price £4.99

This text adventure is rated by Romik as suitable for a beginner and the program has an excellent set of instructions on playing adventures which you read on screen. Romik's adventure cassettes have an 'artist's impression' on the cover just to set the scene. Has save-game option. Could do with a bit more scenario, but at that price maybe you shouldn't ask for much... *JDC*

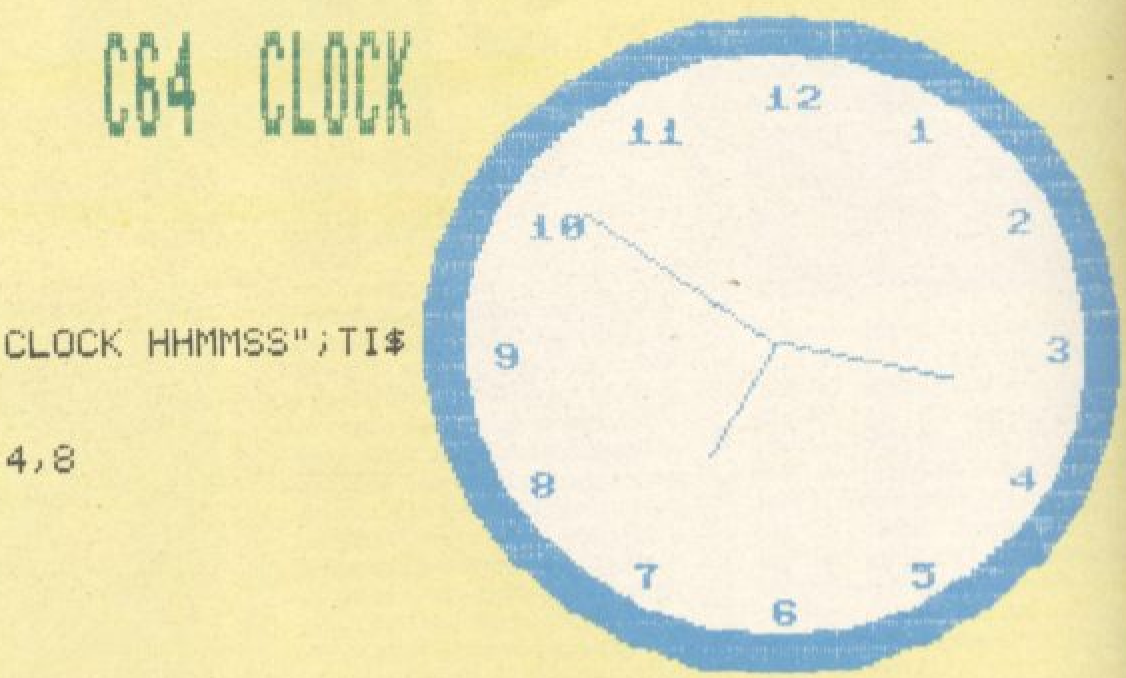
Romik Software.

Presentation:	■■■□□
Skill level:	■■■□□
Interest:	■■■■□
Value for money:	■■■□□



An analogue clock in Simons' Basic

by Albert van Aardt




```
10 INPUT"TIME IN 24 HRS CLOCK HHMMSS";TI$
20 HIRES 0,1
25 TEXT 0,0,"C64",1,4,8
26 TEXT 280,0,"CLOCK",1,4,8
30 XM=160:YM=100:R=90
40 PLOT XM,YM,1
50 CIRCLE XM,YM,R,R,1
60 R=80
70 CIRCLE XM,YM,R,R,1
80 PAINT XM,15,1
90 RR=180/π
100 CH=0:R=70:FOR D=30TO 360 STEP 30
110 A=150+R*COS((270+D)/RR):B=ABS(+YM+R*SIN((270+D)/RR))
120 CH=CH+1:CH$=""+STR$(CH)
130 TEXT A,B,CH$,1,1,8
140 NEXT D
150 S$=RIGHT$(TI$,2):S=VAL(S$)
160 M$=MID$(TI$,3,2):M=VAL(M$)
170 H$=LEFT$(TI$,2):H=VAL(H$)
180 IFM>30THENH=H+1
190 IFH>12THENH=H-12
200 RS=60:RM=45:RH=35
210 ANGL XM,YM,(6*S),RS,RS,1
220 ANGL XM,YM,(6*M),RM,RM,1
230 ANGL XM,YM,(30*H),RH,RH,1
240 IF OT$=TI$THEN220
250 OT$=TI$
260 ANGL XM,YM,(6*S),RS,RS,0
270 S$=RIGHT$(TI$,2):S=VAL(S$)
280 ANGL XM,YM,(6*S),RS,RS,1
290 IF S<>0THEN240
300 ANGL XM,YM,(6*M),RM,RM,0
310 M$=MID$(TI$,3,2):M=VAL(M$)
320 ANGL XM,YM,(6*M),RM,RM,1
330 IF M<>0THEN240
340 ANGL XM,YM,(30*H),RH,RH,0
350 H$=LEFT$(TI$,2):H=VAL(H$)
360 IFM>30THENH=H+1:DS=DS+1
375 IFH>12THENH=H-12
380 ANGL XM,YM,(30*H),RH,RH,1
390 GOTO240
```

There are very few Simons' Basic programs around to show off the power of this enhancement to Basic.

Here is a little one I wrote to brag a bit to my brother-in-law. (He subsequently bought Simons' Basic, so maybe I should get a commission ...) I didn't use the structured code that Simons' Basic provides, because I felt it would be better to keep the new commands to a minimum. All the Simons' Basic commands are in reverse print; and as you can see there are not too many of these.

A few notes on the construction of the program, for converting it to other machines:

- The time variable, TI$, is used as the clock.
- Lines 10 to 230 draw the clock face, put in the numbers 1 to 12, and draw the hands on the clock.
- The variable OT$ is used to check TI$ and see if more than a second has passed. If so, the program draws a new second hand, updates the minute and hour hands if necessary, and checks OT$ again.

You could play around a bit: use different colours, add a chime, maybe add an alarm, date and calendar. The program, as it is, is very basic – and no pun intended!

Jargon generator for the 64

by Fred Reid



Be the envy of politicians, merchant bankers and gas fitters ... the Jargon Generator will help unstick your tongue in times of stress, apply successfully for the jobs well above your station, and give the old boys down the pub something to get their laughing gear around.

The generator works by randomly selecting one 'phrase bit' from each of four groups – beginnings, ends, and middle bits. The completely modular construction ensures total flexibility, in that you are free to substitute your own phraseology in place of that contained in the data statements. Be warned though, the English language is tricky enough at the best of times!

The jargon generator draws this wealth of nonsense from four groups of ten parts; so 40,000 different phrases are possible. The DATA statements in lines 20 to 410 contain the phrases, the random selector is located in lines 550 to 580. The rest of the program is concerned with assembling the strings and presenting them neatly on the screen.

```
5 POKE53280,2:POKE53281,7:PRINT"[CLR] [GRN]"
10 DIMJ$(10,4)
20 DATAIN PARTICULAR
30 DATAON THE OTHER HAND
40 DATAHOWEVER
50 DATASIMILARLY
60 DATAIN A REAL TIME ENVIRONMENT
70 DATAIN THIS CONNECTION
80 DATAAS OF NOW
90 DATAFOR EXAMPLE
100 DATATHUS
110 DATAAS THE "STATE OF THE ART" IMPLIES
120 DATAA LARGE PORTION OF INTERFACE COORDINATION COMUNICATION
130 DATATHE CONCEPT OF ELECTRON MOBILITY
140 DATATHE CHARACTERIZATION OF SPECIFIC CRITERIA
150 DATATHE WORST CASE LOAD SITUATION
160 DATA THE FULLY INTEGRATED TEST PROGRAM
170 DATATHE INCORPORATION OF SERIAL REQUIREMENTS
180 DATAANY ASSOCIATED PERIPHERAL DEVICE
190 DATAA CONSTANT DATA PATH
200 DATAAN INDEPENDENT FUNCTIONAL PRINCIPLE
210 DATAA PRIMARY INTERRELATIONSHIP BETWEEN SYSTEM AND SUBSYSTEM TECHNOLOGIES
220 DATAMUST UTILISE AND BE FUNCTIONALY INTERWOVEN WITH
230 DATAMAXIMISES THE PROBABILITY OF PROJECT SUCCESS USING
240 DATAADDS SPECIFIC PERFORMANCE LIMITS TO
250 DATANECESSITATES THAT URGENT CONSIDERATION BE APPLIED TO
260 DATAREQUIRES CONSIDERABLE SYSTEMS ANALYSIS TO ARRIVE AT
270 DATAIS FURTHER COMPLICATED WHEN TAKING INTO ACCOUNT
280 DATAPRESENTS EXTREMLEY INTERESTING CHALLENGES TO
290 DATARECOGNISES THE IMPORTANCE OF
300 DATAEFFECTS A SIGNIFICANT IMPROVEMENT IN THE PERFORMANCE FACTOR OF
310 DATAADDS OVER-RIDING PERFORMANCE CONSTRAINTS TO
320 DATATHE SOPHISTICATED HARDWARE.
330 DATATHE ANTICIPATED FOURTH GENERATION EQUIPMENT.
340 DATATHE SUBSYSTEM COMPATABILITY RATIO.
350 DATATHE STRUCTURAL DESIGN CONCEPTS.
360 DATATHE PRELIMINARY QUALIFICATION LIMIT.
370 DATATHE EVOLUTION OF SPECIFICATIONS OVER A GIVEN PERIOD OF TIME.
380 DATATHE PHILOSOPHY OF COMPATABILITY AND STANDARDISATION.
390 DATATHE GREATER FIGHT-WORTHINESS CONCEPT.
400 DATAANY DISCRETE CONFIGURATION MODE.
410 DATATHE TOTAL OFFSET DATA ERROR ACCUMILATION.
500 I=1
510 FORT=1TO10:READJ$(T,I)
520 J$(T,I)=J$(T,I)+", ":NEXTT
530 FORI=2TO4:FORT=1TO10:READJ$(T,I):J$(T,I)=J$(T,I)+" ":NEXTT,I
550 T1=INT(RND(TI)*10)+1
560 T2=INT(RND(TI)*10)+1
570 T3=INT(RND(TI)*10)+1
580 T4=INT(RND(TI)*10)+1
590 J$=J$(T1,1)+J$(T2,2)+J$(T3,3)+J$(T4,4)
1000 L=LEN(J$):LJ=0:S=1
1010 FORF=38TOLSTEP38
1020 GOSUB2000
1030 NEXTF
1050 PRINT"[CLR] [5 CDN] [GRN]"
1100 FORP=1TOS-1
1110 PRINTTAB(2)S$(P):PRINT:NEXTP
1120 PRINTTAB(2)RIGHT$(J$,L-LJ)
1130 PRINT"[HME] [23 CDN] [5 CR] [RED] PRESS SPACE FOR NEXT PHRASE"
1150 GETK$:IFK$=""THEN1150
1160 GOTO550
2000 IFMID$(J$,F,1)=" "THENS$(S)=MID$(J$,(LJ+1),F-LJ):GOTO2020
2010 F=F-1:GOTO2000
2020 LJ=F:S=S+1:RETURN
```

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Access VISA

PLOT and UNPLOT

by Barry O'Rourke
Irish Amateur Computer Club

These routines will expand your Vic's potential to extra heights: the absence of SET/RESET or PLOT/UNPLOT on the Vic is annoying, but this program simulates these commands and is almost as fast as the ZX81.

Any of the 16 colours may be specified... but with limitations. The first eight colours can be used, but only two colours per square (i.e. screen colour and character). Only one of the upper eight colours may be used at a time. If this colour is altered, all points plotted in that colour will be changed to the new colour. It is possible to draw a graph on screen and display it in any of 16 colours.

Resolution is limited to 44 x 46. Colour resolution is 22 x 23. Co-ordinates 0,0 are in the top left corner; but if the alternative line 10000 is used instead of line 10000, position 0,0 is in the centre of the screen.

```
10      DIM S(15), T(255)
15      FOR X = 0 to 15: READS(X): T(S(X)) = X:NEXT
20      SC = PEEK (648)* 256: V = 36878.
25      C = 37888+4*(PEEK(36866)AND 128)−SC
30      DATA 32, 126, 123, 97, 124, 226, 255, 236, 108
35      DATA 127, 98, 252, 225, 251, 254, 160.

10000X = INT (X): Y = INT (Y): S = X/2 + Y * 11 + SC
10010XX = (2 ↑ ((−X AND 1) * 2 + (−Y AND 1) ↑ 2;)
10020If Z E I THEN XX = S(T (PEEK (S)) Ø R XX)
10030IF Z = 0 THEN XX = S (T (PEEK (S)) AND 15 − XX)
10040IF U › 7 POKE V,PEEK (V) AND 15 OR (U * 16)
10050POKE C + S, U : POKE S, XX
10060RETURN
```

Line 10000 below is the alternative for 0,0 in the centre of the screen:

```
10000X = INT (X): Y= INT(Y): S= 263 + X/2−Y * 11 + SC
```

The variables used are **X** for the horizontal dimension, **Y** for vertical, **U** for the colour number and **Z** for the operation – Z=1 for PLOT, Z=0 for UNPLOT.

Alpha Sort

by C Peacock

This alphabetical sorting program is an example of a Bubble sort, the most common method used. It can sort up to 600 words into alphabetical order.

Lines 70 to 120 are for the input of data into the variable A$. Line 160 is the line where the comparison is made; note that the ‹ = sign is used to avoid an infinite loop if two items of the data are the same. Lines 170 to 190 swap the words around if they are not in order; note the use of Xs to make sure no data is lost. Line 200 sets C=1 if swapping has occurred.

Line 220 starts the process again unless no swapping has taken place in the last loop.

```
10    REM ***ALPHABETIC SORT***
20    REM *** UP TO 600 WORDS***
30    REM ****COLIN PEACOCK****
40    DIMA$(600)
50    PRINT"(CLR) ALPHABETIC SORT"
60    PRINT"(CUD) TYPE IN UP TO 600 WORDS END
      WITH 999."
70    I=1
80    INPUTA$(I)
90    IFA$(I)="999"THENN=I−1:GOTO140
100   I=I+1
110   IF I=601 THEN PRINT"? TOO MANY
      WORDS":END
120   GOTO80
140   C=0
150   FORI=1TON−1
160   IFA$(I)‹=A$(I+1)THEN210
170   X$=A$(I)
180   A$(I)=A$(I+1)
190   A$(I+1)=X$
200   C=1
210   NEXTI
220   IFC=1THEN140
230   PRINT"(CLR)THE "N"WORDS IN"
240   PRINT"ORDER ARE:"
250   FORI=1TON
260   PRINTA$(I)
270   NEXTI
280   PRINT"(RVS)MORE?"
290   GETM$:IFM$=""THEN290
300   IFM$="Y"THENCLR:RUN
310   END
```

The alterations needed for a numeric sort are listed below:

```
40    DIMA(600)
80    INPUTA(I)
90    IFA(I)=999THEN....
160   IFA(I)‹=A(I+1)THEN210
170   X=A(I)
180   A(I)=A(I+1)
190   A(I+1)=X
260   PRINTA(I)
```

If the ‹ in line 160 is changed to a ›, the numbers will be put into descending order.

The take-away 64



We review Commodore's portable SX-64

Portable computers were all the rage last year. You couldn't really call yourself a computer manufacturer if you didn't have one – either the Tandy/Panasonic/Epson-style 'lap' computer with a built-in flat screen, or a 'real' computer with a conventional display, built-in disk drives, and a carrying handle.

Commodore went for the latter approach with the SX-64. Basically it's a box containing a 64, one floppy disk drive, and a five-inch display with a handle-cum-stand and a cable-connected keyboard that clips on to the front to double as a cover.

Sounds ok so far? Well, there are two ways of looking at the SX. You can consider it in isolation simply as another computer, in which case it's an expensive 64 with some extras and some omissions.

Or you can consider it as something to be used by someone – and then you'll be asking 'who', 'when', 'where' and 'why'. And to confuse the latter assessment there are a couple of bugs in the unguent. Like it costs £895. Like it has only one disk and the standard 6510 microprocessor from the 64, so it doesn't really compare too well as a business computer. Like it has joystick and cartridge ports but no cassette interface, so it doesn't look like a complete home computer system either.

And what's the SX-64? It's a 64 with a 1541 disk in a box, with a built-in screen and the electronics inside the cabinet rather than the keyboard.

Commodore has a different view: or more accurately, a number of different views. It's the "Commodore Portable SX-64 Colour Computer" says the manual, calling it the "Commodore Executive 64" elsewhere with a schizophrenic mien that as we'll see characterises the whole thing. "One of the best values in the home computer industry," it continues; but isn't something called the 'Executive 64' going to be more of a business computer?

Ah well, "the SX-64 is portable computing in the office, home, hotel room or at any location where mains power is available". So it's for everyone, y'see: that's what the PR agency says. But hang on, here's the brochure: "the Commodore SX-64 portable colour computer allows the businessman to truly take his work with him where he goes", it opens. So it's a business computer.

Or maybe not. Paragraph two: "if you're a busy executive keeping a diary, a scientist making notes about experiments, a salesman on a sales call, an on-site engineer, a reporter, an auditor, an accountant, or even a hobbyist who travels, this portable system is a must". Seven to one: must be a business computer.

Ah-ha, the price list: yes, at £895 it's a business computer. So, down to business.

Inside the box

A big box containing the usual quantity of protective polystyrene: embedded therein is an SX, a mains cable (no plug), a keyboard cable (18 ins of it), handbook, cut-price flock-wallpaper handbag (for cables?), and some freebie software.

The thing is basically a deep and surprisingly heavy steel box – weighs 10.5kg, which isn't too bad: measures just over 400mm square by around 135mm (say 15x15x5ins), so for the average purchaser (whoever that is) it shouldn't scrape on the ground. Colour scheme muted elephant grey and matt black, with a few frilly bits in blue and silver.

Carry handle is a nice piece of work, thick and ribbed: you get a good grip on it and it doubles as a stand – ratchet swivel with simple but effective locking mechanism on each pivot. Doesn't really raise the screen high enough for crickfree viewing, though.

Keyboard unclips from the front (spring clips hold it on, feel



less than 100 per cent mighty but keyboard never slipped off while we were carting the review model around) to reveal dinky little screen – 5in diagonal. Also there: one disk drive helpfully labelled 'drive 0', one disk-drive sized gap labelled 'storage', one spring-clipped panel labelled with the CBM logo in sexy silver (opens to reveal display controls and reset button. What's a reset button, daddy?).

After the multi-cable hassles of assembling an ordinary 64 system, it's magic to get up and running by making two connections – mains into back, keyboard to the front via solid 25-pin plugs and usefully long, flexible cable. The keyboard can stay attached when clipped back on for transit, but then the plug juts out a bit.

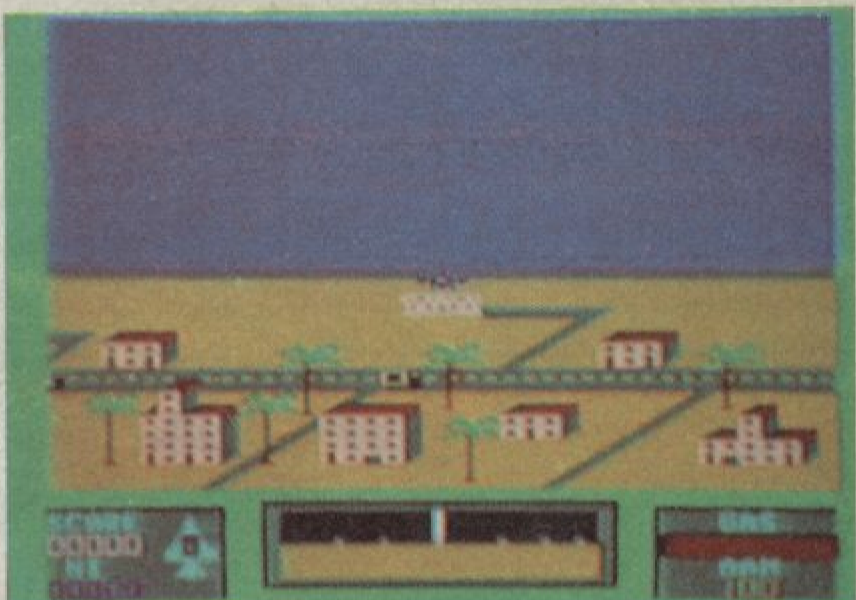
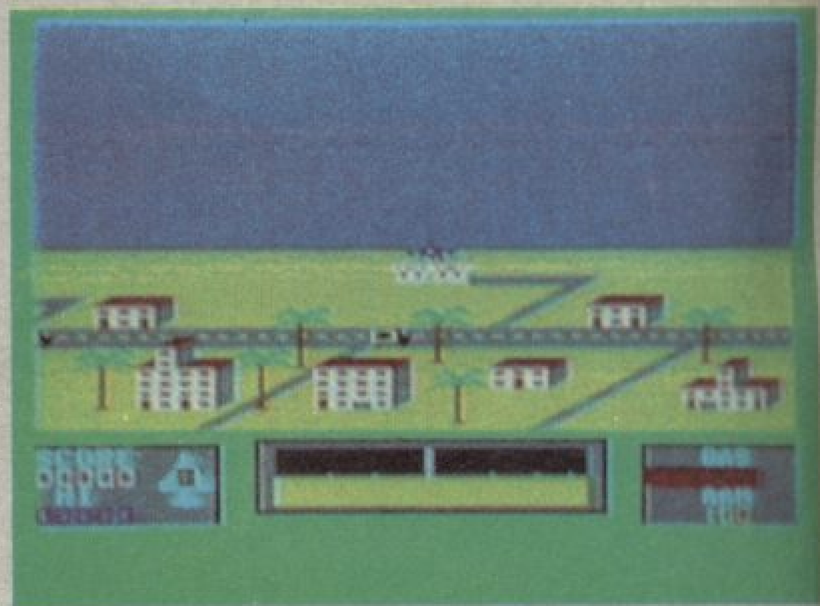
The keyboard is a restyled version of the 64's, with all 67 keys in the same layout. The keytops are smaller and the whole thing looks a lot more modern – very European, cleaner and clearer, with the keytop characters fashionably offset to the top left corner of the keys and the number keys printed with both the Control and CBM colours. 'Control' is spelt out, too, rather than being 'CTRL': so is 'Clear', but 'Insert' stays as 'Inst' for some reason. It's physically smaller than the 64 keyboard, but in terms of getting your fingers on to the keytops that's no problem.

No 'on' light to show you that the thing's working if the screen has blown, though. At least there's one on the Shift Lock.

The disk is obviously a repackaged 1541 for 5.25in 170KB floppies; comes complete with 1541's clunk-click latch and formatting characters. No improvement on 1541 speed. The 'storage' hole is a joke: may be useful for the leads in transit, but you can't fit disks into it unless they're out of their card overcoat (not recommended); the manual won't fit either, and it's too deep for pencils and too tight for buns (sandwiches might fit).

The display (reputedly a Sony screen) is a colour monitor – no watching Football Focus or Dallas on it. Displays the 64's 16 colours, 255 screen/border combinations, 25 40-character rows (but can scroll over 240 characters), bit-mapped for 320x200 pixels' worth of hi-res graphics. Text looks a bit dotty on it, and there's a slight but noticeable refresh flicker: but colours reproduce well, and hi-res graphics can look very crisp.

Start-up display is the Vic-style dark blue characters on white background with cyan border. The border isn't proportionally as large as on the 64 because the

Monitors compared. Left: the display on a JVC screen, identical in size to the SX64's (courtesy Telesonic Tottenham Court Road.) Right: the integral screen. Note the fuzziness around the word "gas". The game is Virgin's Falcon Patrol, of course.

screen surround chops off the edges: gives the illusion of a near screen-size display area, but the sharp edge looks better anyhow.

Open the dinky little door and there's dinky little controls for volume (yes, the SX has its own speaker – pretty good one too, considerable loudness and little distortion), brightness, contrast, colour balance and vertical hold. Plus two fine-tuning screwdriver holes for contrast and brightness, which makes up for the limited turn range on the knobs.

And then there's the reset button. Tiny, discreet, unexplained. On most computers there's a reset button which does the same as Run/Stop and restore followed by NEW, but this isn't one. No-one at Commodore could tell us what it's for; only effect seems to be spinning the disk. For emergency hang-ups? Surely Commodore isn't admitting that the 1541 is prone to hang?

Atop there's the cartridge slot, clean and easy insertion through small flush-fitting spring-loaded doors. All the 64 cartridges we tried worked ok; they look a bit wierd sticking out of the top, but it's better than fiddling around the back.

Where you'll find a big finned heat disperser below a neat strip of standard 64 sockets – two joystick ports, DIN sockets for audio/video and serial, user port, mains lead, 1.5A fuse, chunky power switch.

Obvious absentee: cassette port. That's the major technical difference between the 64 and the SX. Not only have all the tape electronics and the edge connector been omitted, the Kernal's been modified to kill all reference to it. Like the SX gives 'ILLEGAL DEVICE NUMBER' when you try to read from or write to device 1, the cassette.

Instead there's a new meaning to the instant-load method of pressing Shifted Run/Stop: it produced LOAD":*",8 and RUN to load and run automatically the first thing the SX finds on disk. Note that they didn't amend the Kernal enough to make the disk rather than tape the default device – try typing LOAD "FILENAME" and you'll get the cheery illegal device message; you still have to laboriously spell it out as LOAD "FILENAME",8.

That kind of thing is a bit of a shame, since there has been some messing around in the Kernal –opening message promotes SX-64 BASIC V2.0 not COMMODORE BASIC V2; some tidying up to cursor handling and jumps has been done, and there's a whole new routine at 58579-58588 in what was formerly empty memory. It's only short, but we haven't yet been able to figure out what it does.

No other Kernal changes, and none to Basic. A real missed opportunity for simplified disk handling in particular; the SX is stuck with Basic 2.0's protracted OPEN and PRINT# disk controls rather than the shorter and easier commands offered in Basic 4.0 from the 700 (if it still exists) and the 8000s.

True, there is the DOS Wedge on the TEST/DEMO disk supplied; sits on the cassette buffer, gives two-key disk directory (non-destructive) and file load. But it still has to be loaded; it could have been Kernalled. Ditto the disk copying programs supplied (one for single-disk copying, one for twin drives). There's still no quick 'n' easy formatting.

Freebies

That TEST/DEMO also includes a 'how to use' text display (which says very little other than to name the utilities it provides) and a few SX demos (which to our mind didn't really make the most of the SX's facilities).

The other freebies to sell you on the SX are three packages and a diskfull of six games. The games are so-so to good. The fruit machine has good graphics but some oddities (like you can hold a winning line: doesn't happen that way at our local) and anyhow fruit machine games are boring. The text-only mini-Adventure serves as an intro to the genre (120 rooms, 53 objects to collect; but again some inconsistencies). The 3D maze is ok; so is the 2D Patience.

Average arcade action comes as a very ordinary 2D depthcharge game; much better is a travelling gunsight plus laser cannons to zap the Imperial fighters from space (really difficult at level 9).

The games may not be great; how about the packages, worth £210 according to Commodore? Well, there's Precision's well-known Easy Script word processor now branded by Commodore. Not at all a bad WP package, with many top-notch facilities including tabs, search-and-replace/delete, mail-merge for personalising form letters. It's by no means the easiest 64 word processor to use, though, and you'll find more facilities and more friendliness from other WP software on the 64 ... but then you'll pay extra for it.

Future Finance is a financial planning program producing cashflows and gross and net profitability forecasts from your input of up to 15 sales items, 15 purchase heads, and 30 nominal (expense) items. If you need more than that, you can split the model into different parts and later consolidate them. Various output report formats for different needs.

Problem? It's slow, awkward (especially on consolidations) and inflexible to use (for instance you can't edit a mistyped input – you have to do the whole entry again). One of the many decent spreadsheets for the 64 will be easier and better ... but then you'll pay extra again.

Anagram's Easy Stock is probably the best of the three in that it's as good as most inventory packages on the 64. Takes a while to define your stock file, but thereafter works well; book orders in and out, see stock-lows and slow movers highlighted, produce stock movement analyses (only two sales analysis codes though), do profitability assessments and stocktakes (including an override to alter stock quantity for pilferage and breakages without affecting values of sales and purchases), raise the price across the board by a percentage, and so on. Several good and useful reporting options using all or part of the file, too.

Major omission: no parts explosion for manufacturers, but then it's obviously aimed at retailers. Only significant complaints, then, are the thing's

inflexibility (no tailoring is possible, like it won't cope with your giving selective discounts on selected lines to selected customers) and the use of lower-case letters in the display – may look nice on a big screen, but too small really for the mini display.

Manual labour

The SX handbook is a classic Commodore opus. Lie-flat spiral binding, 174 pages plus two blank ones labelled 'MEMO' and the useless bound-in 'Quick Reference Card' – all printed on that glossy paper which turns into superglue when you spill coffee on to it.

Inside there's a mish-mash of reprinted and/or lightly rewritten sections from the 64 handbook and the 1541 manual. Not very well mish-mashed, either: random access files and block read/write on page 27? In a section called 'Getting Started'?

Much hilarity too in 'Expanding your system'. Has anyone seen a 64 IEEE Interface Card in any Commodore dealers? Or the Z-80 cartridge with CP/M? Or the Speech Module? Or the Superexpander 64? Or the modem – "lets you use your telephone to connect your Executive 64 to other computers and information retrieval services"?

Or a Prestel link or networking on the Pet emulator? All promised in the brochure ...

Is this the portable computer for you?

The fashion for portables with a 'real' display (a TV-like CRT monitor capable of showing enough characters at a time to be useful) and a 'real' keyboard (with typewriter-style keys rather than the Spectrum/PC jr 'Chiclet' pushbuttons) was all started by the (largely self-styled) microcomputer industry guru Adam Osborne.

He sold a lot of Osborne 1s before he went bust. That computer was/is surprisingly unadventurous technically, with a conventional eight-bit micro in there along with two floppy disk drives and a tiny eye-straining screen in a bulky and ugly box (personal opinion – some people like it).

But it was/is portable (especially if you want to develop your biceps). It was/is complete – all you need is a printer. It had/has a proper keyboard, a proper screen, a proper disk operating system. And the price was/is really attractive, particularly as it includes a lot of free software.



Since the Osborne's launch, though, portables have come a long way. Displays are bigger and better, the virtually indestructible Sony micro-floppies are being used, 16-bit processors are now de rigeur, compatibility with the IBM PC (or more specifically with the huge amount of good-quality software available for the PC) is the norm, the styling has infinitely improved.

But who needs a portable computer anyway? It costs money to build something that's robust enough to stand being lugged around, and there are all kinds of technical and ergonomic compromises that have to be made in manufacturing a physically compact unit. Are there that many people who need a computer to take with them whenever they leave the office or their home?

In fact it looks as though most portables for the business world aren't actually ported very much at all; they tend to sit on a desk more or less all their working lives. Not unlike a conventional non-portable computer, in fact.

Now, there is probably a case for arguing that some business people will want to take a computer home for out-of-hours work.Travelling salesmen and suchlike use a portable for instant recording of visits and (hopefully) orders, perhaps with a phone link back to the head office computer to down-line the data collected. It's certainly useful for software developers to have a luggable computer: they tend to want to work wherever they happen to be. And there's at least one computer journalist makes a habit of getting up people's noses by sitting on the front row of press conferences clacking away at a portable computer.

What's more, there probably is also a market for a small, neat, compact and complete home computer – everything you need in one box with just one mains lead, as an alternative to the spaghetti of wiring that connects a plethora of small boxes to each other and to your TV set.

The appropriate comparison could be with those portable stereos with clip-on detachable speakers on the side of a compact unit containing amp, tuner and tape deck: you may not get as much in the way of hi-fi quality as with a component set-up, and you'll probably omit some things like a record deck. But in return you have an easy-to-use simply-connected unit that's physically small, which delivers pretty good quality and at a pretty low price.

So where does the SX-64 fit in?

On the plus side it's quite a nice piece of design work. It looks quite good, feels solid, is heavy but fairly comfortable to carry, has no irritating reflective surfaces.

There is the video-out connection for attaching a full-size monitor, but in any case the little display is pretty legible. The small size of the characters gets in the way of comprehension only on some 'curved' letters like capital 'S'.

Key bored

Then there's the keyboard. Styling is ok, if you accept that any portable with typewriter-style keys isn't going to leave a lot of room on the actual keyboard for considerate extras



like space to rest your palm. The styling of the SX's keys (including dished keytops and slightly raked keyboard – just what ergonomicists recommend) is better than the standard 64's, and their labelling (including the extra colours accessed by the CBM key) is both clear and more helpful.

On the debit side, the keyboard is much too light: a solid plate of lead in it wouldn't have added much to the overall weight, and it would have made the keyboard feel a lot more solid (a psychological consideration, maybe) while stopping it sliding around at the slightest touch (entirely practical).

And the key action is awful – far too light, far too clacky, generally imprecise. Our spacebar felt like the spring had failed at one end, so it didn't register at all if you hit the left side; hope that doesn't happen too often on other keys.

Identity crisis?

Then there's the two real problems, the things that confuse the SX's identity comprehensively: cassette and disk. Providing a diskfull of games would point to a home-computer appeal ... or maybe not, since the games are average at best. Commodore could have given away some much better offerings if it wanted to impress the domestic punter: how about the International Soccer cartridge?

Nor does it provide any of the facilities that home users would have found so helpful for programming – no extra sprite and sound commands on disk or cartridge, for instance.

Since tape will be the cheap and obvious home-computer storage and program distribution method for some time to come it looks as though the SX isn't a home computer. Not for the average buyer, anyhow, even if said average hacker can stump up the necessary readies.

The business person and the software developer are the other candidates among the SX's potential market. Both need disk, and indeed there is a disk ... but what a disk! It's the 1541, for a start; a temperamental little number, to say the least.

And only one drive. For serious work (notably to take back-up copies and for handling applications that require both a data file and a program disk available all the time) you really need two. You could attach another 1541 to the serial port and use it as device no. 9, but that rather removes one of the points about a complete portable system – and those 1541s are notoriously sensitive: you can't lug them around like you can the 64.

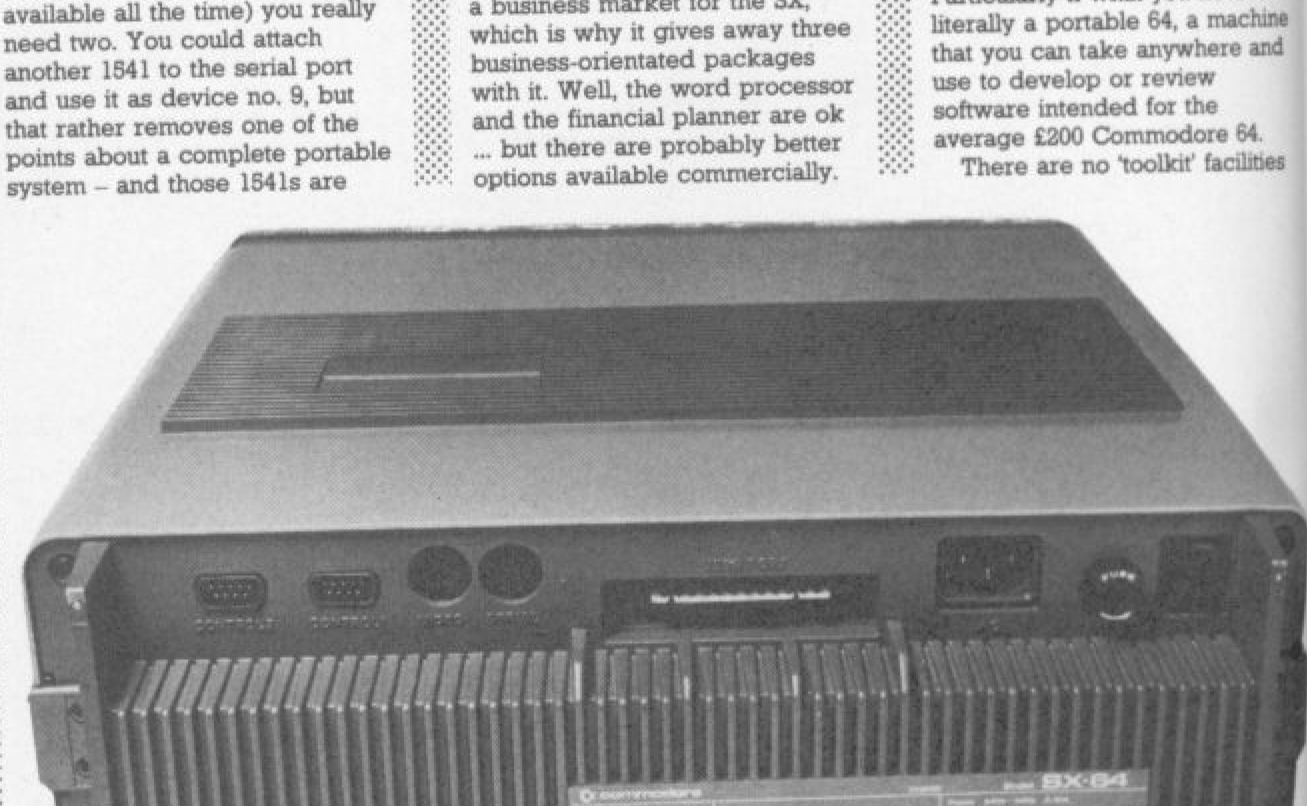
There is in theory a DX-64 too – 'SX' presumably meaning 'Single-disk Executive computer', with 'DX' being the 'Double-disk' sibling. The manual talks about it, and all the 1983 PR from Commodore suggested a twin-disk portable as the main product with the single-disk version being the el cheapo model for the impecunious. But the DX isn't here yet, and we hear that it never will be – reportedly Commodore has found it really difficult to get two 1541-style drives into the box.

Commodore presumably sees a business market for the SX, which is why it gives away three business-orientated packages with it. Well, the word processor and the financial planner are ok ... but there are probably better options available commercially.

Anagram's stock control package is a good piece of 64 software, but it's a curious choice of freebie: a file-orientated application like inventory really shows up the limitations of speed, capacity and overall flexibility that the 64-plus-1541 combo necessarily imposes. Besides, stock control isn't the most commonly required of business tasks for microcomputers; a sales ledger with VAT computation would surely have appealed to a wider range of people.

As a software developer's tool – and for magazine reviewers and programmers! – the SX-64 isn't all that bad, however. Particularly if what you need is literally a portable 64, a machine that you can take anywhere and use to develop or review software intended for the average £200 Commodore 64.

There are no 'toolkit' facilities



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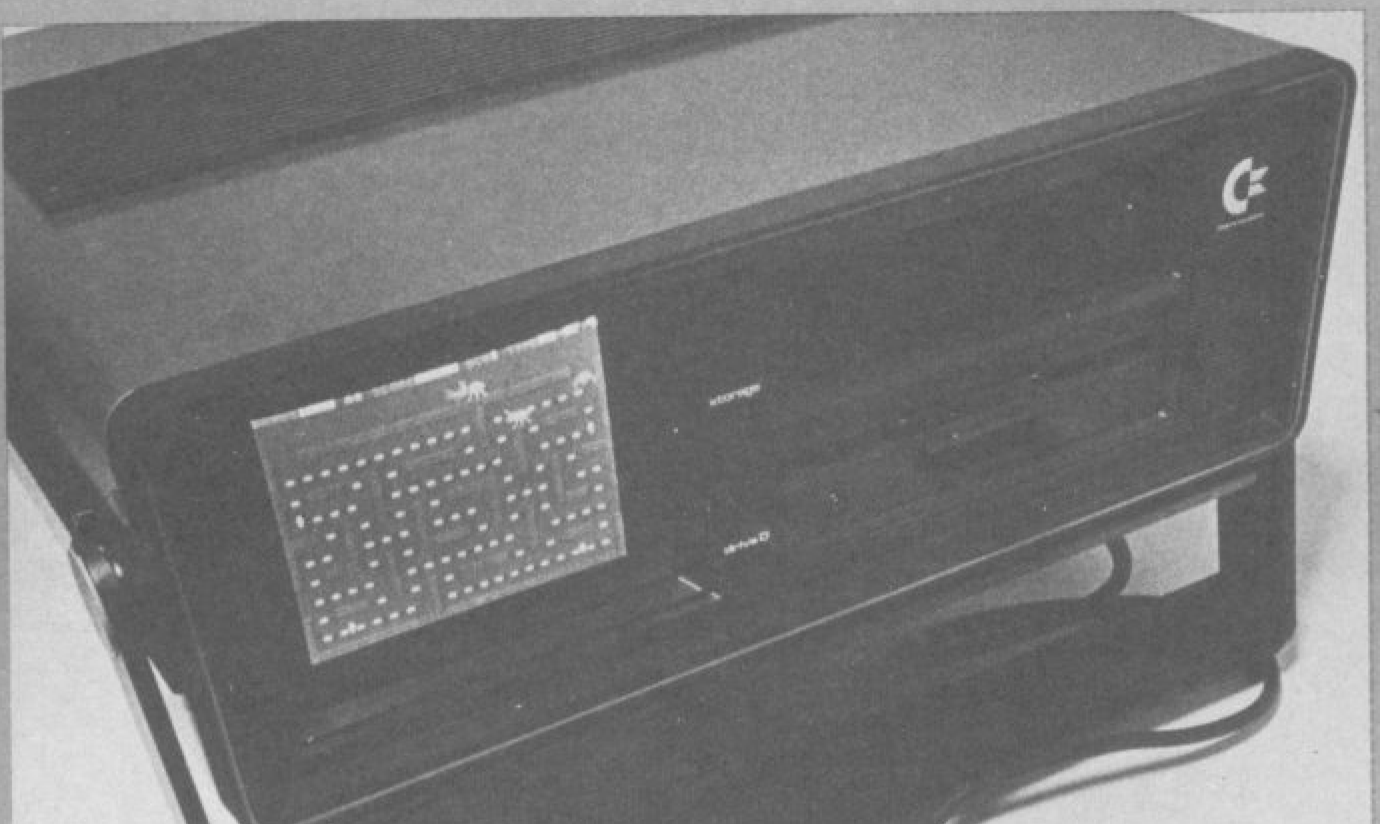
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Under review	Commodore SX-64
Description:	**Portable 64 computer with integral single disk, screen, loudspeaker**
Supplier:	**Commodore Business Machines**
Address:	**675 Ajax Avenue Slough Berks SL1 (via dealers)**
Telephone:	**0752 74111**
Summary:	**Neat, quite clever: but schizophrenic pricing and specification**
Price:	**£895 (includes three packages)**

built into the 64, though; and nor is there a freebie disk full of those little essentials that would make programming the thing a lot easier. Why not a cut-down Programmer's Aid on disk?

Maybe Commodore doesn't see a software development market. But with the proviso that cassette would be useful, the other deficiencies and drawbacks pale into irrelevance against the fact that the SX is an ideal homework machine for people working with 64s; for us the SX-64 would be ideal.

The REAL problem ...

But there you come up against the major problem – the price tag. At £895 the thing is just too expensive to be a home computer, but it's also too expensive to be a straight portable 64. Using your home TV you can have a 64 with a 1541 for about £400; for not much more than half the SX's price you can get a decent monitor as well. The freebie software isn't worth the difference.

The word is that Commodore wants so few sales that the limited production facilities it has in Japan for the thing won't be embarrassingly overstretched. Seen in that light, the SX-64 is probably a market research and R&D exercise which will allow Commodore to get some idea of what the punters want and try out some packaging techniques to deliver that sometime in the future.

The SX is a neatly packaged and highly-priced 64 with a 1541, loaded with all the deficiencies implied by that and also blessed with most of the virtues of the combination. But as it stands, the SX-64 doesn't really look like a computer for anyone in particular.

But when the price drops to £499, it'll be a Good Buy for software writers and maybe for business users with a really tight budget: when the DX appears at £895 the business market will really open up for it: when there's a faster CPU and more functions in ROM and a rewrite of the DOS and higher-capacity microfloppies or maybe a 5MB mini-Winchester for less than £1,500, it'll sell a million. Shame about the keyboard.

But anyhow, that's not the SX-64: that's the next-generation product for which the SX-64 looks like a suck-it-and-see exercise.

MULTIPLAN – The ultimate spreadsheet

SYLK? – What's the Dif?

by Karl Dallas

For years spreadsheet users have been asking if there's life after Visicalc. Karl Dallas looks through MULTIPLAN's eight windows and finds the view is very fine indeed.

You can't squeeze a quart into a pint pot, they say – though the way software companies are exploiting the comparatively limited memory of the smaller computers in ways that would make owners of some minis green with envy, I'm beginning to doubt the truth of the aphorism.

This is particularly noticeable with business software for the 64, which though it may offer the user some 35K more usable memory than is available to the humble Vic-owner, it is still a comparatively small machine, compared with "proper" business computers like the 8096 or 700, which can go up to 256K of memory, though it has to be banked, of course.

Multiplan is Microsoft's enormously powerful spreadsheet program which usually runs on powerful 16-bit machines like the Sirius and Apricot, as well as the bigger Apples, and the news that it had become available for the 64, and at a price almost half of that for the other machines must have caused some raised eyebrows in software circles.

On the "you gets what you pays for" principle, many must have wondered what had been left out. The answer is, quite simply: almost nothing.

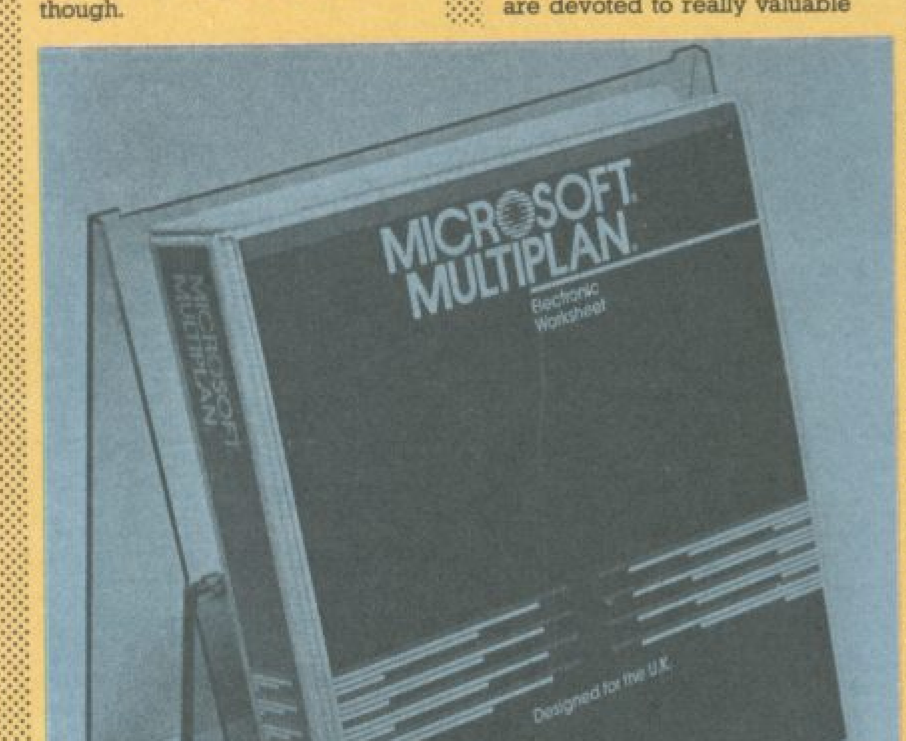
Multiplan is, without question, the spreadsheet which has answered almost all the objections which could be levelled at all others of its kind, and in fact it is so far ahead of all the others – including the great-grandaddy of 'em all, Visicalc – that the busy reader can skip all of what follows and simply make a note that Multiplan is the spreadsheet to get, and any criticisms I may be able to summon up may be put down to nit-picking or carping. It's rather like the car critic who objects that the new Lamborghini ashtray isn't quite up to the mark!

For instance, it has particularly powerful WINDOWing facilities, making it possible to view up to eight windows from the one sheet on screen at the same time. Certain pairs (one pair at a time) can be fixed to scroll in sync with each other. This is more powerful than Calc Result, for instance, which can create two windows and split a window as well, even viewing two worksheets on screen at a time through the windows. Multiplan allows only one sheet on screen, though.

There is one catch to all this power, of course, which is due to the limitations of the hardware rather than the program.

In order to leave as much of the 64's memory for what matters – the sheet itself – Multiplan accesses the disk fairly frequently. A glance at the system disk directory (see illustration) will show you what I mean: it is divided into seven areas, of which the first 64 blocks are devoted to the "boot" program and the basic code, with over 400 other blocks of mainly sequential and relative files which are accessed as the sheet is developed.

Of these, a hefty 153 blocks are devoted to really valuable help screens, which make the superb manual almost superfluous.



This wouldn't be entirely a bad thing with a disk-drive of average speed, but the 1541 is s-o-o-o slow that each time there's an overlay, the time seems to stretch out into an eternity, even if it's just a second or so in reality.

Personally, I always try to get 8050-formatted copies of programs for this very reason, but they aren't available for Multiplan, and since the disk is uncopyable (theoretically, at least), there's no way of transferring it from one format to another, unless you're a disk "bit-copying" genius.

The other thing that needs to be said, I suppose, is that it isn't a 3D spreadsheet like Calc Result (the advanced version). Only one sheet can be held in memory at a time, but there is a very sophisticated eXternal command, which allows the sheet in memory to be linked in all sorts of ways with files on disk.

There is also a "SYLK" (SYmbolic LinK) file format, which allows the interchange of information between Multiplan and other programs, similar to Visicalc's Data Interchange Format (DIF), but although the manual says that DIF files can be accessed via SYLK, there is no detailed description of how this can be done, presumably by stripping off the DIF header and tail tuple and vector information from the DIF file and turning it into an ASCII sequential file.

This is a pity, since it's quite likely that Multiplan purchasers may have already had some experience of Visicalc – or, more probably, of Calc Result, which also supports DIF – and would like to be able to access the data produced by the earlier system after an upgrade.

Installation

Multiplan comes as a single 5¼ in disk plus a lavishly printed A5 manual in ring-binder, all in a snazzy Perspex box which folds out to become a really stable bookstand to hold the manual – or, for that matter, anything else, copy etc.

And what a manual!

Nearly 450 pages of it: 29 pages of setting up and operating instructions; 188-page guide to using Multiplan, with a detailed tutorial about the mythical Spencer Ceramics company to illustrate how it works; 34-page "Multiplan in Depth" followed by an 83-page Command Directory and a 44-page Function Directory, ten pages of explanations of the various messages and prompts that appear on the screen, plus over 30 pages of appendices explaining the intricacies of SYLK and such arcane matters as Iteration, together with a really full index.

Really, this is a model of its kind!

One small problem is that the bulk of the manual was produced for users of the Apple version, and there are slight differences in the screen displays (40 columns instead of 80 on the Apple, three-line instead of two-line menus, slight truncation of some messages and prompts). There is, however, an entirely 64-specific "reference-card" – actually a very clear and concise 16-page booklet which is easier to follow than some manuals!

Explanation of printer support could be better. The manual says it supports the VIC-1525 printer "or any printer compatible with the VIC-1525", but when I tried to get it to drive an Olympia ESW3000 daisywheel via an Interpod I got capitals where I typed lower-case and vice versa. Anyone using an interface with code conversion (eg a Small Systems Engineering B300) could change the mode, but this should also be possible under software control from within the program, though the manual doesn't tell you how and even Microsoft couldn't tell me how to do it!

The manual assumes that if you have more than one disk drive it must be another 1541 (which would be device 9), rather than a double-drive 4040, which, though no longer made, uses the same disk format as the 1541 and allows drive 0 to carry the program and drive 1 the data disk, which is good practice.

Though the main Multiplan program is uncopiable, the essential "MP.SYS" can be copied on to data disks, allowing them to be run in a single drive, without frequent swapping between program and data disks.

After LOADing and RUNning the brief loader program, the Multiplan logo comes on to the screen after about 30 seconds and the blank spreadsheet about 1 minute 20 seconds after that and you're ready to go.

Operation

Unlike Visicalc, which assumes that an entry that begins with a letter is a LABEL (text) unless preceded by +, −, or a bracket, or Calc Result, which assumes that an entry is a VALUE unless preceded by a space, Multiplan requires to be told each time whether it's ALPHA or VALUE, either by keying the initial A or V, by pressing RETURN (since the cursor is initially on ALPHA), by TABbing the cursor through the three-line menu by use of the f1 function key or space (or back, by using INST/DEL), or by CTRL-A for an ALPHA entry.

At any time, keying "?" will invoke a HELP screen which explains the command under the cursor in some detail. There is no facility for editing, truncating, or adding HELP screens.

As with all spreadsheets, each cell has a co-ordinate reference, used in GOTO, DELETE ROW/COL or INSERT ROW/COL commands, and so on. Vertical and horizontal axes are both numbered, so that the third cell down in the first column is R3C1 rather than A3, which is slightly long-winded to key in compared with most other spreadsheets. The maximum number of columns in a spreadsheet is 63; the maximum number of rows is 255.

Any individual column can be given its own individual width, between three and 32 characters.

Review

Horizontal and vertical TITLEs can be fixed.

If CONTinuous format is defined, text that is too wide for the individual cell will continue into the next cell, if it's empty, and so on through an entire row of cells, if required.

Individual formulae or labels can be LOCKed and cannot then be altered. The same toggle-like command unLOCKs the cell, if it needs to be altered subsequently. The L F sequence will LOCK all formulae or cells on the sheet.

The program makes no use of the 64's colour capability though it will overlay whatever screen/border/character combination has been POKEd into the machine before Multiplan is LOADed. It would have been useful if windows could be distinguished in different colours, for instance. There is an audible alarm which can be MUTEd.

Simple "low-res" bar charts of asterisks can be created to display figures rounded to an integer number, so that all figures between 2.5 and 3.5 will be displayed as three asterisks, for instance. With the REPT command, charts can be constructed from other characters.

Instead of co-ordinates, formulae can refer to series of cells (eg part of a column) by a NAME, invoked by the appropriate command and cell co-ordinates at the time of creation. So a column NAMEd "Net" could be accessed by the formula:

VAT = Net*.15

and the subsequent formula could be:

Gross = Net +VAT

Conclusions

Apart from the time taken accessing the disk, this is the sweetest-tempered spreadsheet program I've ever used, and I've tried most of them. I don't think it can be crashed; the worst it will do to you is clang reproachfully and display an ILLEGAL PARAMETER message if you do something forbidden.

As I've indicated, the documentation is superb – though not quite perfect – and if I wasn't locked into Visicalc so firmly, I'd be seriously tempted to use it to run my entire life. I still might, if someone can tell me how to convert my Visicalc files, and how to get my printer to behave itself with it.

Verdict

FOR: Powerful, value-for-money, well documented, useful HELP screens

AGAINST: Uses disk a lot, minimal use of colour or graphics, poor documentation on printer support.

Excellent +

Under review	Multiplan
Description:	Spreadsheet
Supplier:	Kobra Micro Marketing
Address:	PO Box 28 Henley on Thames RG9 1PF
Telephone:	04912 2512
Language:	Machine-code
Summary:	Superbly documented spreadsheet, slowed down somewhat by disk access time, but still probably the best there is
Price:	£99.95

Screen scene for the 64

Disk games special

AZTEC CHALLENGE

Joystick
Price £12.95

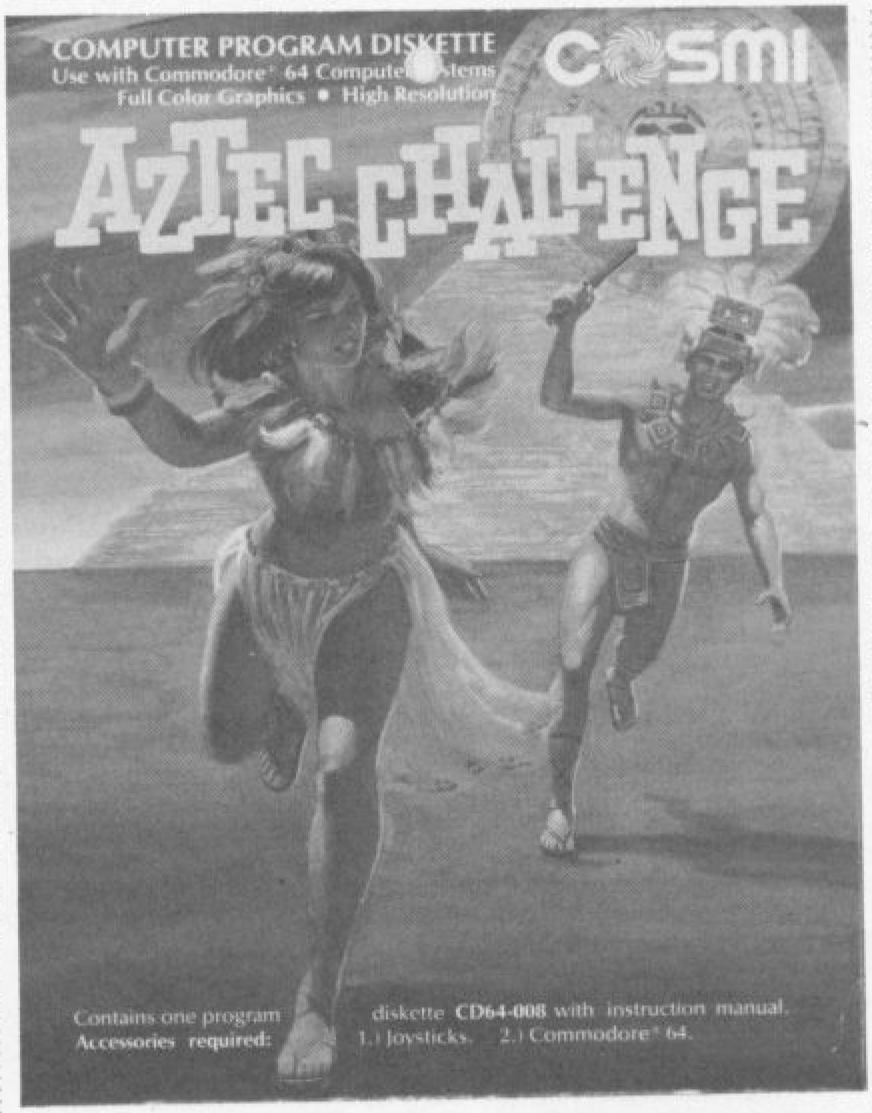
If you fancy yourself as a joystick wizard, if your reflexes are on the microsecond side of sharp, and if you want a multi-screen multiple-challenge game that could easily last you all day (we spent about seven hours completing the game), you could do worse than consider *Aztec Challenge*.

In spite of the length it's not an Adventure – just a series of seven very different tasks to be completed successfully. The scenario is that you're an Aztec selected as a human sacrifice, your only chance being the successful completion of several challenges. None are easy, all are fun.

Each player (one or two) gets five lives with which to complete each stage: use them up and you're back at the start of that stage (though thankfully you're not dumped back to the beginning of the game). You first run a gauntlet of your erstwhile pals chucking spears at you (joystick down to jump over them, up to duck under the spears). If you make it to the temple you dodge tumbling boulders as you pant up the (very long) stairs to the entrance – joystick right and left.

Once inside you have to negotiate different rooms with various hazards like bits of roof falling in, saws appearing out of the floor, chasms opening up ... Here your bloke is running like a looney anyhow, and your joystick is used to stop him and have him leap over obstacles. Beyond that, there's the neighbourhood vermin to vault over, everything from snakes and scorpions to iguanas and sludge. Then you're at a tile-hopping problem, with some tiles booby-trapped. Beyond that is a lake full of pirhana fish to swim through. And finally, there's the real pig of a problem, a bridge with one, two or three steps missing: joystick up to make your running Aztec leap three steps, left for two, down for one. The gaps come so quickly that you need really acute reflexes to make the right movement.

And that's the seventh and final stage ... except that you now start on phase two, where everything happens much more quickly. Get through that, and it's all quicker still. And then you do it all again by night.



We took all day to get through phase one, and it's rivetting. See all the different uses of the joystick? Very neat. And with a couple of exceptions (notably the unconvincing vermin) the graphics on each stage are really excellent, especially in terms of attention to detail: the wall hangings in the temple rooms are positively Art, the Aztec's loin cloth flaps convincingly (if demurely) while he runs, his feet go like crazy, the piranha swarm in like ... well, like piranha. Sound for that one is also great, though on the whole the designers went rather OTT on the soundtrack; it gets boring after a while.

Ignore the graphics on the cover, by the way, which feature a young lady with overdeveloped mammories being chased by a smiling gent with bulging loincloth, bottled tan and silly hair-do. It's all sadly irrelevant. *JC/DJ*

Cosmi via Audiogenic

Presentation:	■■■■□
Skill level:	■■■■□
Interest:	■■■■■
Value for money:	■■■■□

FORBIDDEN FOREST

Joystick
Price £12.95

Another Cosmi offering, and this one is MAGIC. No, it's better than that. OTT music and introductory screens again, but at least they allow you to admire the author's care with detail and his facility with 64 programming – quite brilliant use of colour, graphics, sprites and sound effects.

Interesting scenario, too. You're a hunter armed with a bow and arrow, wandering for some reason through an evil forest. You're actually after the Demargorgon, though Lord knows why: he's surrounded himself with a variety of generally offensive monsters.

Multiple levels of play again, and a choice of difficulty level from 1 ('innocent') to 4 (described quite accurately as 'crazy'). Starts quite easily with an attack from a swarm of king-size spiders: you have to press the fire button once to load, again to shoot. You're better off running away once you've loaded, because you don't get enough time to do both before the spiders get

At which point you'll notice the fabulous scenery effects, with a real sense of perspective: the landscape further away scrolls past more slowly than the immediate background, the sun moves around its orbit as you play, night falls and the moon rises, the moon wanes and day breaks again ... Wow!

Anyhow, defeat the spiders and you go into a lunatic dance of joy. Fun the first time, but it goes on ... and on, and on. And it happens every time you pass to the next stage. Which, after the spiders, is the king-size killer bee. Then comes a shower of outsize frogs: easy enough to kill, but even if a dead one lands on you, you end up looking like something you wouldn't offer your cat. Following that is a fireball-dropping dragon – very difficult to hit, very nasty when you get hit (barbecue time).

The dragon we found very tricky to get past. But then there's the really difficult one: a convincingly evil phantom hiding behind the trees most of the time, with trying for a between-the-eyes shot (well, between what would be the eyes if he/she/it had any). Meanwhile, you're also avoiding a bunch of gibbering skeletons armed with toasting forks. You can knock them off easily enough, but getting the phantom isn't easy.

Then the game gets damn near impossible, because having seen his minions vanquished and being naturally a bit less than sanguine about that the Big D himself takes a hand. The sky darkens, lots of lightning, occasional glimpses of large but essentially shapeless mass: You've got 60 seconds to detect and despatch him, and he's invulnerable except for one spot between the eyes ...

Kapow. Enough variety in play to make things interesting, a complicated scoring system to rack up Hi Scores with your buddies, but especially the superb graphics and good detail – they all make this one something rather special. Shame about the intrusive sound and interminable jigs, but all in all a big hand for author Paul Norman. *JC/DJ*

Cosmi via Audiogenic

Presentation:	■■■■■
Skill level:	■■■■□
Interest:	■■■■■
Value for money:	■■■■□

FRANTIC FREDDIE

Joystick
Price £12.95

Amazingly quick load, of course and PRINT FRE(0) shows 28K left.

With more and more 64s being sold with a disk drive, it's logical enough to see the arrival of a number of games on 1541 floppy disks. Now, you've all played games on cassette and on plug-in cartridge: what's so special about games on disk?

but typing RUN chains in another program ("one moment please") which is rather slower. Obviously solid machine code when it gets there, though. Both seem to be the norm for diskette games.

Frantic Freddie is a telephone engineer (it says here) who shins up and down poles on to different levels, collecting pots of gold (10 points) and hoping to get hit by the passing star (100) while avoiding the Greeblies – a bit dumb, but lethally eager to knock Freddie off the grid.

So it's another up-and-down-the-ladders Kong-style game. But it's a pretty superior version – lots of nice detail (Freddie bounces engagingly into oblivion when a Greeblie does the business on him) and several levels of increasingly difficult play. OK graphics, very good use of colour, excellent soundtrack in a rock 'n' roll style reminiscent of the late 60s. It's not especially original, and it is all a bit two-dimensional (particularly by comparison with some of the others here); but the level of interest is maintained by a program of silly interludes, useless bonuses, and a constant stream of messages along the top of the screen. *DJ*

Commercial Data Systems via Audiogenic

Presentation:	■■■■□
Skill level:	■■■■□
Interest:	■■■□□
Value for money:	■■■□□

LASER STRIKE
Joystick
Price £10.50

Of the disks for review, this is the most conventional in the arcade game style . You're in the ground-hopping space fighter trying to get through the asteroid fields and then the ice caves; sounds familiar?

Well, yes it is. But if you like arcade action, you could do worse. The sound effects are muted but realistic, and the graphics look good (with the possible exception of your not infrequent demise, which looks like no explosion I ever saw in *Star Wars*). There's a satisfyingly difficult and increasingly complex path to follow, with a variety of hazards and a rub-your-tummy-while-patting-your-head collection of controls to manipulate and parameters to watch – joystick up, down and forward to move: back to bomb: fire to (would you believe) fire your laser cannon. Plus a top-line display for number of ships, score, and number of defences remaining per section.

The asteroid fields and the ice caves each have eight sections. Every time you pass on to the next the game speeds up a bit, you get 10 points, and the solar pods turn into debris.

The what? Well, the solar pods scattered in your path are harmless until they turn orange, which means they are lethal debris. They get to be debris arbitrarily from time to time; or you can do it for yourself by shooting at them – hit them and you get 10 points. You can also score by hitting the bases on the landscape scrolling by beneath – direct hits on reactor towers only, though it's not easy to distinguish towers from the rest of the base; and every time you fire or bomb you lose a point. Then there's the missile, launched from time to time from the ground. It's pretty sluggish and easily avoided, unless you're dodging meteorites and debris at the time. You also get 100 points if you can zap it, though that isn't easy.

Near the end of section eight you'll come across the orbiting Control Centre, worth a thousand points and an extra ship if you hit it (you start with three ships).

The ice caves are a bit disappointing after that. Still not easy, mind, but basically, you're just avoiding the walls while still finding bases to bomb.

Conclusion? New ideas may be attractive, but there's nothing wrong with familiarity. And this is a solid enough version of a standard arcade game, done with no little care and a satisfying degree of difficulty. *DJ*

Isis Hathor

Presentation:	■■■■□
Skill level:	■■■■□
Interest:	■■■□□
Value for money:	■■■■□

SLINKY
Joystick
Price £12.95

A third from Cosmi, and it's Paul Norman again (he did the 64 version, someone called Vance Kozik gets the credit for the original). And it's better than *Forbidden Forest*.

Here, the applause doesn't go so much on the clever graphics and scene-setting effects: it's more because of the novelty of the game itself, the way it requires some intellectual skill from the player as well as mere reflexes and joystick dexterity, and the author's evident sense of humour.

Novelty? You're controlling one of those metal spiral executive-toy things that will walk down stairs. You're on a grid (looks very good, very 3D) and you have to touch every square. Apart from the black holes, which return you to the start position at the top left corner. When you touch a square (and only diagonal movements on the joystick will work!) it changes colour, so you have to alter the colour of all the squares on the grid. Easy, huh?

You start with 25,000 points and you lose some every time you hit a square – though there's a bonus if you land on one of the randomly flashing squares. You lose more points if you're dirty when you're hopping, and you get dirty by bumping into an occasional dust cloud called Dusty. There's another hazard that appears randomly, a passing magnet called Marge. Then there's Ralph the Random Raindrop; if you're clean and it hits you, you can move faster. But if you're dirty you rust, so you get hauled off by Oil Can Charlie and you lose a life – you also lose a life if you jump off the edge.

Sense of humour? When you get through each stage there's a daft 'cartoon featurette' – which starts with an explosion of flags, fireworks and hip-hip-hoorays generally to the 1812 Overture. If you get through without losing a life (you start with five) there's a fun 'instant replay' of your moves.

Then there's stage two, where the squares change colour every time you touch them – so jump back on to a square and it reverts. The hazard this time is a species of lunatic vice (no, not that kind of vice). Up another level and it's Lorenzo the cube-hopper, an irritating little bug who follows you and will dump you off the grid when it catches you. Thereafter successive levels feature different combinations of these.

This game has the lot. It's different, it looks very good, the progressive increase in difficulty and variety of hazards maintains the interest, it requires some care and some skill while at the same time retaining that important element of luck (usually bad) ... In short, it engages the senses. Is that too heavy a judgement? Well, try it for yourself. No apologies for the top marks – it's the best game we've seen so far this year! *JC/DJ*

Cosmi via Audiogenic

Presentation:	■■■■■
Skill level:	■■■■■
Interest:	■■■■■
Value for money:	■■■■■

ZEPPELIN RESCUE
Joystick
Price £19.95

Not an easy one, this. It doesn't sound great – you're piloting a Zeppelin (well, it looks more like the Goodyear blimp as featured at the Cup Final) to rescue various individuals from a variety of city locations. The graphics aren't fabulous, with washed-out shades of blue. So why did I enjoy it so much?

Well, for a start the program shows a good deal of care. It cares about the tedium of lengthy text intros and extended graphics interludes between plays, so there aren't many. It's clever enough to give you a pre-game 'practice mode', and it lets you decide the game parameters – how many games before the shutters come down, how many ships per game, one or two players. And it cares enough for veracity to give you a fiendishly difficult control problem: those Zeppelins are damn unmanoeuverable!

A realistically tricky steering problem is what takes most of the program; there's only about 6,000 bytes free when it's loaded, though machine code would have been more economical than Basic. Since it's not a fast-action sharp-reflexes game, the slowness of Basic isn't particularly a handicap – and it's possibly a virtue, since the problem with steering is the leaden, lumpy, flying habits of the ship.

The action starts with a somewhat 2D city and desperate individuals screeching to the tops of skyscrapers. You drift into the top of the screen and go to collect them ... avoiding buildings, naturally, but also steering clear of the curious red zap-filled clouds. Subsequent levels (five different cityscapes in all) give you different steering problems to solve, including an evil one that has you negotiating a miniature gap in a suspension bridge to pick up the idiot who got trapped on one of the piers underneath.

The main appeal is the skill requirement. Presumably it is possible to become really proficient with the joystick, at which point the game becomes only average: but the difficulty is so great that the boredom threshold looks a long way off. *DJ*

Computer Software Associates via Marketing Micro Software

Presentation:	■■■□□
Skill level:	■■■■□
Interest:	■■■□□
Value for money:	■■■■□

The 5th International Commodore Computer Show.

PREVIEW

commodore

Number One in the world of microcomputers.

The 5th International Commodore Computer Show.

Dear Reader

1984 will see the fifth year of the International Commodore Computer Show. Due to popular demand we will be holding 2 shows:

__In London__

on : 7th, 8th and 9th June
at the : Novotel London, Hammersmith, London W6
(Formerly the Cunard International)

__In Leeds__

on : 27th, 28th and 29th September
at the : Leeds Exhibition Centre, Sovereign Street, Leeds

The Shows will be packed with events and to give you a sneak preview, here are just some of the features you can expect to see:

- EXCITING NEW PRODUCTS FROM COMMODORE
- HOSTS FROM A NATIONAL RADIO STATION
- CELEBRITY GUESTS INCLUDING INTERNATIONAL FOOTBALLERS
- COMPETITIONS SEMINARS AND SPECIAL PROMOTIONS
- MORE EXHIBITORS THAN EVER BEFORE

Don't miss this opportunity to see what is latest and best for Commodore users.

Best Wishes

AILEEN BRADLEY
Show Organiser

commodore

Number One in the world of microcomputers.

Commodore Computer, Exhibition Department, 675 Ajax Avenue, Slough, Berkshire SL1 4BG.

Show

COUNT-DOWN TO THE COMMODORE SHOW

THIS YEAR split across two venues – London's Novotel in June and Leeds Exhibition Centre in September – the Fifth International Commodore Show will be a magnet to all users who want to be firstest with the latest. Here's the first of two exclusive previews.

SIX NEW COMMODORES FOR THE FIFTH COMMODORE SHOW

Always the high-point for the dedicated Commodore fan, this year the Fifth International Commodore Show at the Novotel, Hammersmith, London from June 7 to 9 will be even more of a must, with the news that the company will be showing no fewer than six new machines there (see story on news pages).

In addition, users outside London will have a second chance to see the goodies on display – and, to be honest, to see how many of the new ideas of June have become no more than fading gleams in the company's collective eye as the marketing realism of autumn begins to bite – at the Northern Commodore Show in Leeds from September 27 to 29.

Attendance at Commodore Shows has mirrored the explosive growth of the personal computer market: when the original calculator-keyboard Pet was only just beginning to revolutionise the entire scene, a bare 5,000 punters found their way to the first Pet show at the Cafe Royal. In 1981, the year of the 8000-series 80-column business machine, it attracted 8,000 – appropriate, that; and in 1982, year of the Vic, the figures had grown to 12,000. Last year, with the 64 turning everyone's heads around, attendance had more than doubled at 25,000. And this year it already seems likely that organiser Fiona Anderson's prediction of 40,000 in London and Leeds will be more than exceeded.

Fun and games

Quite apart from the individual exhibits – already demonstrating a sizeable industry involvement and still rising – the "features" of the exhibition itself will attract enormous interest, with the involvement of Radio Luxembourg on a daily basis, daily seminars (featuring such well-known international pundits as Jim Butterfield, Jack Cohen, Mike Todd and Brian Grainger – most of whom will be familiar to *CU* readers), International Football and Basketball challenges featuring soccer and basketball stars playing the highly-acclaimed cartridge games, TV "stars and planets" presenter Patrick Moore introducing his astronomy program, B.J. the Bear (star of the new talking educational software) appearing in person, a running business simulation using the famed Corplan software, and illustrations of entries for the International Computer Art Challenge, in a setting allowing would-be electronic artists to have hands-on experience of programming graphics are other attractions.

New machines

But inevitably, the main interest will centre on the new machines – all six of them, including the long-awaited 16-bit Commodore PC, plus five important peripherals. Already, major Commodore software house Prec·sion Software has announced that they are converting their Superbase package (which has already sold over 10,000 copies in its 64 version) to run on the new IBM look-alike machine, not only taking advantage of its 256K memory and 320K disk storage (compared with the mere 38.9K memory and 170K of disk space on the 64/1541 combination), but also including a number of enhancements.

These will expand the possible record size to 2000 characters, will permit screen or report formats up to 240 characters wide (with lateral scrolling on screen formats, of course), and will add a full editor, making virtually a word processor as well. The price is not yet known.

Here are the specifications of the new equipment.

COMPUTERS

Commodore 16

Described by Commodore as "a very advanced home computer with features normally found on computers costing much more ... designed with first-time users in mind", in many ways the 16 could be considered as a 16K version of the 64. It has a slightly more sophisticated keyboard than its big brother, with four cursor keys and a help key.

This, they say, will be "a great asset when learning to program" since "it highlights errors in lines of programming right down to the individual instructions and tells you why they went wrong".

It will be interesting to see how much more informative this is than Commodore's well-known (and frequently infuriatingly unhelpful) "SYNTAX ERROR" message.

Like the new 264 and V364 machines, the 16 has Basic 3.5, which has over 75 commands "including built-in graphics and sound commands".

Like them, too, it has a built-in machine language monitor and a screen windowing capability.

Specification

Memory
16K RAM Standard – 12K RAM user accessible for Basic programs.

ROM
32K ROM Standard (includes operating system and Basic interpreter).

Microprocessor
7501 Microprocessor. 0.89 to 1.76 MHz clock.

Display
40 columns x 25 lines of text.

Colours
121 colours (15 colours: 8 luminance levels + black).

Characters
Upper and lower case letters, numerals and symbols. Reverse and flashing characters. All Pet graphic characters.

Display Modes
Text characters. High resolution graphics/multi-colour graphics. Split screen text/high resolution graphics or multi-colour.

Resolution
320 x 200 Pixels.

Sound
2 Tone generators or 1 Tone and 1 white noise generator.

Volume
9 Volume levels.

Keyboard
Full size/full stroke design.

Keys
66 keys total. 4 cursor control keys. 4 programmed (reprogrammable) function keys (up to 8 user defined functions possible). Colour control keys. Help key. Upper and lower case character set. Graphics character set.

Inputs/Outputs
C16 user port. Commodore serial port. ROM cartridge and parallel disk drive port. 2 joystick ports. C1531 Cassette unit interface port. Monitor output – composite chrominance/luminance. Audio input/output. Power supply input.

Peripherals
SFS 481 fast disk drive. C1542 disk drive unit. C1531 datasette. MCS 801 colour dot matrix printer. MPS 802 dot matrix printer. DPS 1101 daisy wheel printer. C 1520 printer/plotter. C 1703 colour monitor.

Other Peripherals
Will also work with: C 1541 disk drive unit, C1526 dot matrix printer.

Dimensions
Height 3½ ins
Width 16 ins
Depth 6 ins

Power consumption
8½ Watts maximum.

Commodore 264

At first sight, the main difference between the 16 and the 264 is the 60K of user-available memory available in the latter machine though it's a new style of casing with "arrow" cursor keys and function keys along the top. In fact, the ROM and RAM in the 264 totals 96K.

Specification

Memory
64K RAM Standard – 60K RAM user accessible for Basic programs.

ROM
32K ROM Standard (includes operating system and Basic interpreter).

Microprocessor
7501 Microprocessor. 0.89 to 1.76 MHz clock.

Display
40 columns x 25 lines of text.

Colours
121 colours (15 colours: 8 luminance levels + black).

Characters
Upper and lower case letters, numerals and symbols. Reverse and flashing characters. All Pet graphic characters.

Display Modes
Text characters. High resolution graphics/multi-colour graphics. Split screen text/high resolution, graphics or multi-colour.

Resolution
320 x 200 Pixels.

Sound
2 Tone generators or 1 Tone and 1 white noise generator.

Volume
9 Volume levels.

Keyboard
Full size/full stroke design.

Keys
67 keys total. 4 cursor control keys. 4 programmed (reprogrammable) function keys (up to 8 user defined functions possible). Colour control keys. Help key. Upper and lower case character set. Graphics character set. Reset button. Escape key.

Inputs/Outputs
264 user port. Commodore serial port. ROM cartridge and parallel disk drive port. 2 joystick ports. C1531 Cassette unit interface port. Monitor output – composite chrominance/luminance. Audio input/output. Power supply input.

Features
Built-in Basic 3.5 – over 75 commands including built-in graphics and sound commands. Built-in Machine Language Monitor with 12 commands. Screen Window capability.

Dimensions
Height 2½ ins
Width 13¼ ins
Depth 7¾ ins

Net Weight
3 lbs 10 oz.

Power consumption
8½ Watts maximum.

Commodore V364

This is an upgraded 264, with a 250-word vocabulary speech synthesiser, 67-key keyboard including separate numeric keypad, help key and reset button. The vocabulary can be supplemented from cartridge or disk. It has ROM-resident "3-plus-1" combined WP, spreadsheet and database program.

Specification

Memory
64K RAM Standard – 60K RAM user accessible for Basic programs.

ROM
32K ROM Standard (includes operating system and Basic interpreter).

Microprocessor
7501 Microprocessor. 0.89 to 1.76 MHz clock.

Display
40 columns x 25 lines of text.

Colours
121 colours (15 colours: 8 luminance levels + black).

Characters
Upper and lower case letters, numerals and symbols. Reverse and flashing characters. All Pet graphic characters.

Display Modes
Text characters. High resolution graphics/multi-colour graphics. Split screen text/high resolution, graphics or multi-colour.

Resolution
320 x 200 Pixels.

Sound
2 Tone generators or 1 Tone and 1 white noise generator.

Volume
9 Volume levels.

Speech
Speech capability built-in. Over 250 word vocabulary included. Additional vocabulary can be loaded from optional cartridges or disks.

Keyboard
Full size/full stroke design.

Keys
67 keys total. 4 cursor control keys. 4 programmed (reprogrammable) function keys (up to 8 user defined functions possible). Colour control keys. Help key. Upper and lower case character set. Graphics character set. Reset button. Escape key.

Inputs/Outputs
264 user port. Commodore serial port. ROM cartridge and parallel disk drive port. 2 joystick ports. C1531 Cassette unit interface port. Monitor output – composite chrominance/luminance. Audio input/output. Power supply input.

Features
Built-in Basic 3.5 – over 75 commands including built-in graphics and sound commands. Built-in Machine Language Monitor with 12 commands. Screen Window capability. Various built-in software options.

Dimensions
Height 2⅝ ins
Width 16⅝ ins
Depth 9⅝ ins

Net Weight
3 lbs 10 oz.

Power consumption
8½ Watts maximum.



8296

Similar to 8096 except with 24K system memory in ROM and 128K user RAM. It is likely that it will be shown with UCSD Pascal.

Specification

Microprocessor
MOS 6502.

Numeric data format
Floating point mantissa 9 digit. Exponent 2 digit.

System memory
24K ROM. 2K RAM.

User area
128K RAM.

Keyboard
Detachable. Qwerty layout 73 keys. Separate numeric pad.

Display
80-column, 25 row green phosphor integral screen with full Commodore graphics and alphanumeric character set.

Input/output
IEEE-488. User port. Memory and I/O expansion Bus. User port. Cassette port.

Language
Built-in Basic interpreter.

Variables
Real, Integer, String.

Array variables
Real, Integer, String-single and multidimensional.

System commands
LOAD, SAVE, DLOAD, DSAVE, RUN, STOP, END, CONT, PEEK, POKE, SYS, WAIT, USR, CATALOG, DIRECTORY, COPY, BACKUP, HEADER, CONCAT, SCRATCH, RENAME.

Editing and formatting commands
LIST, REM, TAB, SPC, POS, CLR/HOME, INST, DEL, CRSR Controls, ESC, TAB Key.

Array and string commands
DIM, LEN, STR$, VAL, CHR$, ASC, LEFT$, RIGHT$, MID$.

Input/output commands
INPUT, GET, DATA, READ, RESTORE, PRINT.

Program flow
GOTO, IF ... THEN, FOR ... TO ... NEXT, GOSUB, RETURN, ON-GOTO, ON-GOSUB.

File commands
OPEN, CLOSE, DOPEN#, APPEND#, DCLOSE#, RECORD#, PRINT#, GET#, INPUT#.

Algebraic operators
=, +, −, *, /, ↑, <>, <, >, <=, >=.

Logical operators
AND, OR, NOT.

Dimensions
Height 460mm
Depth of CPU 400mm
Depth of keyboard 245mm
Width 460mm

There are also plans to show a machine running under Unix.

Peripherals
SFS 481 dusk drive

The long-awaited speedier disk drive for the Vic and 64, with a maximum data transfer rate of 1675 bytes per second, allowing an average access time of 295 milliseconds.

Still only 170K of storage, though.

Specification

Maximum storage
170K of data (formatted) – 35 tracks.

File types
Program, sequential, relative and user.

Number of files
Up to 144 different files per diskette.

Media
Standard 5¼ in diskettes (hard or soft sector accepted).

Data transfer rate
1675 Bytes/sec maximum (parallel). Average access time 295 milliseconds.

Controller
6510 Microprocessor – 2MHz clock from Commodore's MOS Division.

Memory
2K RAM, 16K ROM.

Media compatibility
C 1542, C 1541, 4040 and 2031 format disks.

Power consumption
30 Watts maximum.

DPS 1101 daisywheel printer

Using a 100-character Triumph-Adler compatible typewheel,

printing at 18 cps, switch-selectable between CBM ASCII and standard ASCII, switch or software-selectable 10/12/15 or proportional pitch, offering underlining, bold and shadow print, horizontal and vertical TAB, subscript and superscript, the new daisywheel is bi-directional, but uni-directional print can be selected as an alternative.

Specification

Print method
Bi-directional impact daisy wheel.

Print wheel
100 character print wheel. Triumph-Adler compatible.

Characters
Upper and lower case, numerals and symbols. Special characters available on optional print wheel.

Character codes
CBM or Standard ASCII (switch selectable).

Print speed
18 characters per second.

Maximum paper width
110 columns (10 pitch).
132 columns (12 pitch).
165 columns (15 pitch).
82 to 220 columns (proportional spacing).

Character spacing
10, 12 or 15 CPI, or proportional spacing.

Line feed spacing
48 lines/inch maximum.

Line feed speed
1 line/second maximum.

Paper feed
Frictional feed.

Paper width
13 inch.

No of copies
Two plus original.

Interface
Commodore serial.

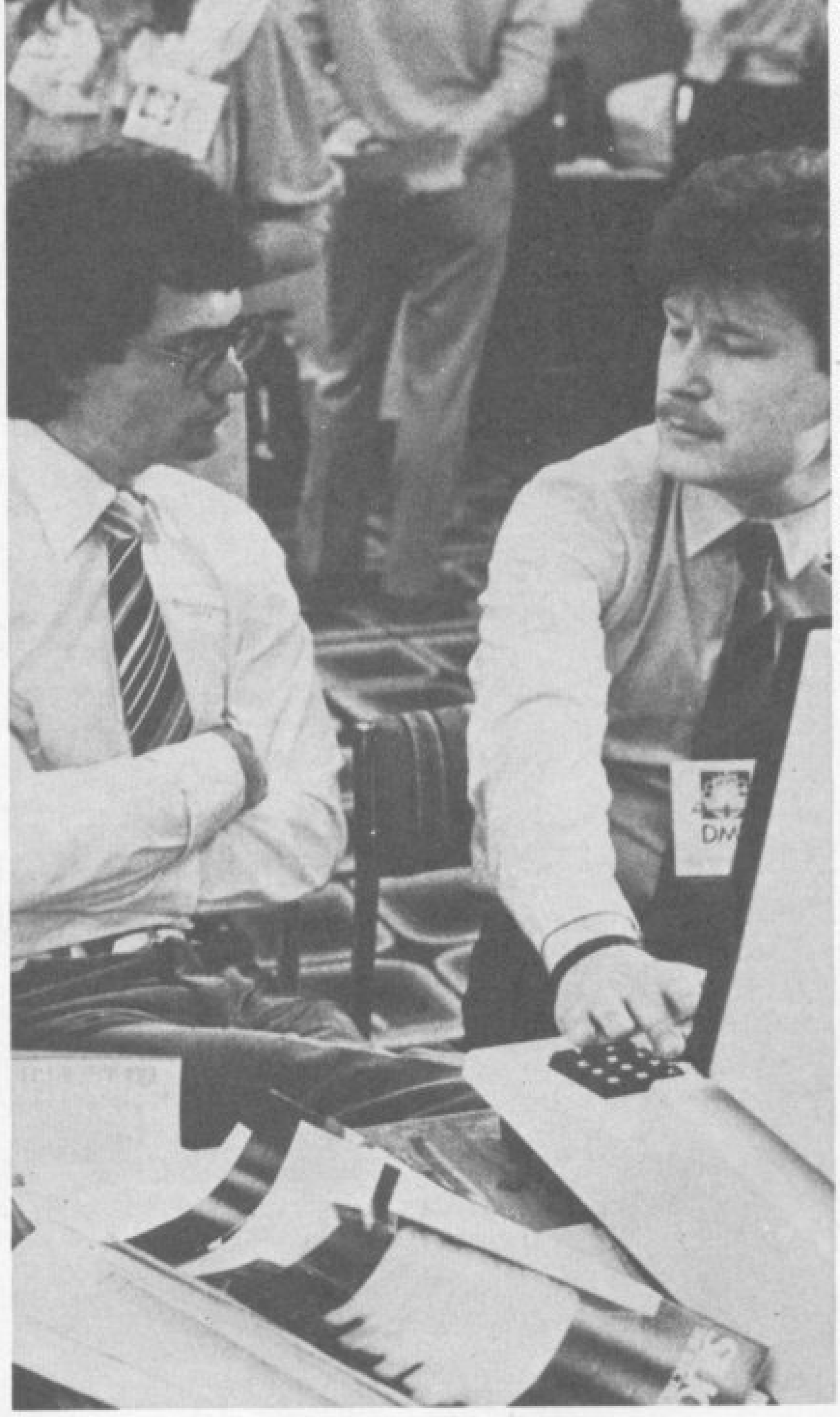
Dimensions
Height 5⅞ in.
Width 20½ in.
Depth 14½ in.

Net weight
27 lbs 8 ozs.

Power consumption
50 Watts maximum.

MCS801 dot-matrix colour printer

Seven-colour dump of hi-res screen is possible, and letter printing is at 38 cps with an 8 x 8 matrix.



Specification

Print method
Impact dot matrix.

Print rate
38 CPS.

Character font
8 x 8 dot matrix.

Printing colours
Black, cyan, purple, magenta, red, yellow and green.

Character set
Upper/lower case, numerals, symbols, Pet graphics.

Character size
Height 8 dots (2.39 mm).
Width 8 dots (2.03 mm).

Number of copies
One monochrome plus original.

Line spacing
Programmable (set at 1/16 in).

Paper width
4½ in to 10 in width (including tractor holes).

Paper feed
Tractor feed only.

Ink ribbon
Special cartridge type.

Dimensions
Height 141.8 mm.
Width 477.5 mm.
Depth 348.5 mm.

Weight
5.2kg.

1703 colour video monitor

A high-quality monitor, suitable for use with a computer or VCR, and having a front-mounted composite video socket and rear-mounted sockets for luminance and chrominance and audio signals, in keeping with the current trend towards component video.

Specification

Colour system
PAL.

Screen size
13 in.

Audio
Built-in amplifier and speaker.

EXTERNAL INPUT TERMINALS

Video input
Input type: Composite video signal.
Input level: 1.0 Vp-p (sync negative 0.3V).
Input impedance: 75 ohms.
Connector type: phono.

Commodore video input
LUMINANCE SIGNAL INPUT
Input type: Composite video signal (VS).
Input level: 1.0 Vp-p (sync negative 0.3V).
Input impedance: 75 ohms.
Connector type: phono.
CHROMINANCE SIGNAL INPUT
Input type: PAL chroma signal.
Input level: 1.0Vp-p.
Input impedance: 75 ohms.
Connector type: phono.

Audio input
Input level: 1.0Vp-p.
Input impedance: 10K.
Connector type: Phono.

Dimensions
Height: 13 ins.
Width: 14½ ins.
Depth: 15 ins.

Weight
25.6 lbs.

NB: The monitor comes complete with an 8-pin connecting lead. A 5-pin lead will be required for use with the Vic-20 and early Commodore 64's.

1531 cassette unit

The specification of this device does not make clear how it will differ from the existing C2N cassette unit, apart from the inclusion of a recording light.

Show

Up and coming. . . .

Obviously, at this stage, the majority of exhibitors are still finalising plans, frantically debugging recently completed products to get them ready, or even smugly keeping their plans to themselves so that competitors get no wind of them. But here are a few of the nuggets we've been able to glean.

For a fuller preview, see next issue. Exhibitors are asked to get their info to us by April 30 at the latest.

Adman

The newly-released speech synthesiser for the 64, along the lines of their already highly-successful cartridge for the Vic-20, will be shown by Adman along with supporting software like Bugbyte's "Twin Kingdom Valley" graphics adventure game, which has a vocabulary of 400 words, Voyager's action game, "Attack Attack", and Thor's 3D arcade-type "Silicon Fish", to mention only three. The speech cartridge is £49.95 inclusive of VAT.

Also being shown are 16K and 8K RAMpacks for the Vic, a 3-slot motherboard, and of course the Vic speech synthesiser.

Anagram Systems

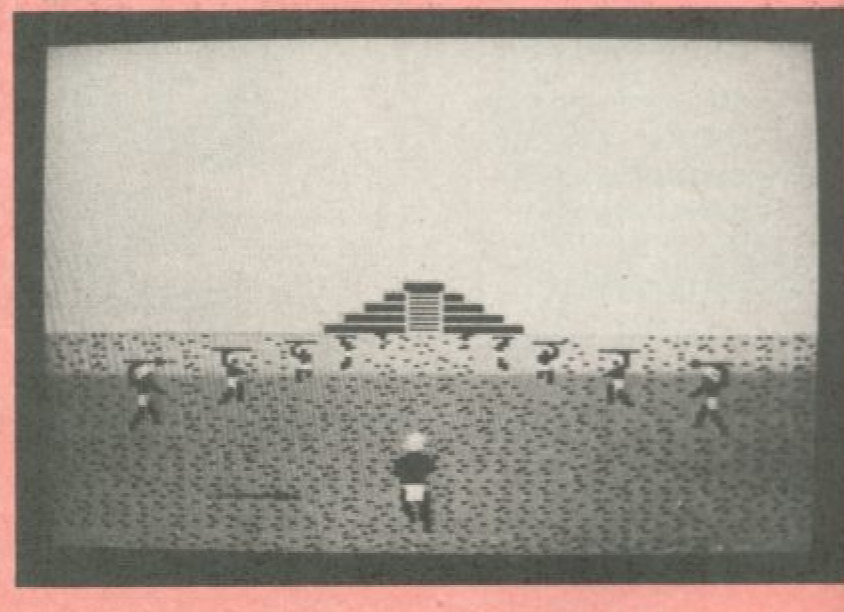
Two ledger packages for the 64, including Easy Stock previously marketed by Commodore, will be shown at £75, inclusive of VAT, together with two business packages for the 700/8096 series, priced £1494 and £1839 respectively.

Audiogenic

A new disk-based game, "Alice in Videoland", which they claim "set new standards in games and graphics programming on the Commodore 64, and "Swift", a 64 spreadsheet "with facilities rivalled only by the likes of Lotus 1-2-3" – a brave claim – head up the Audiogenic exhibit, along with recent games like Forbidden Forest, Frantic Freddie, Pegasis, Aztec Challenge, and the addictive Slinky, as well as the Koala Pad graphics tablet.

Automation Facilities

Pride of place among the computer cleaning products on show is taken by the Microkit, £20.64 inc. VAT, including Floppyclene disk drive cleaner, Safeclene head cleaner, Foamclene anti-static case cleaner and Safeclens screen cleaner. They will also be showing the new Blister kit refills for the Microkit.



Bubble Bus

Three new products to be shown in their purpose- built Bubble Bus will be a 3D war game, Bubble's first adventure program, and an all-action arcade game.

Dataview Ltd

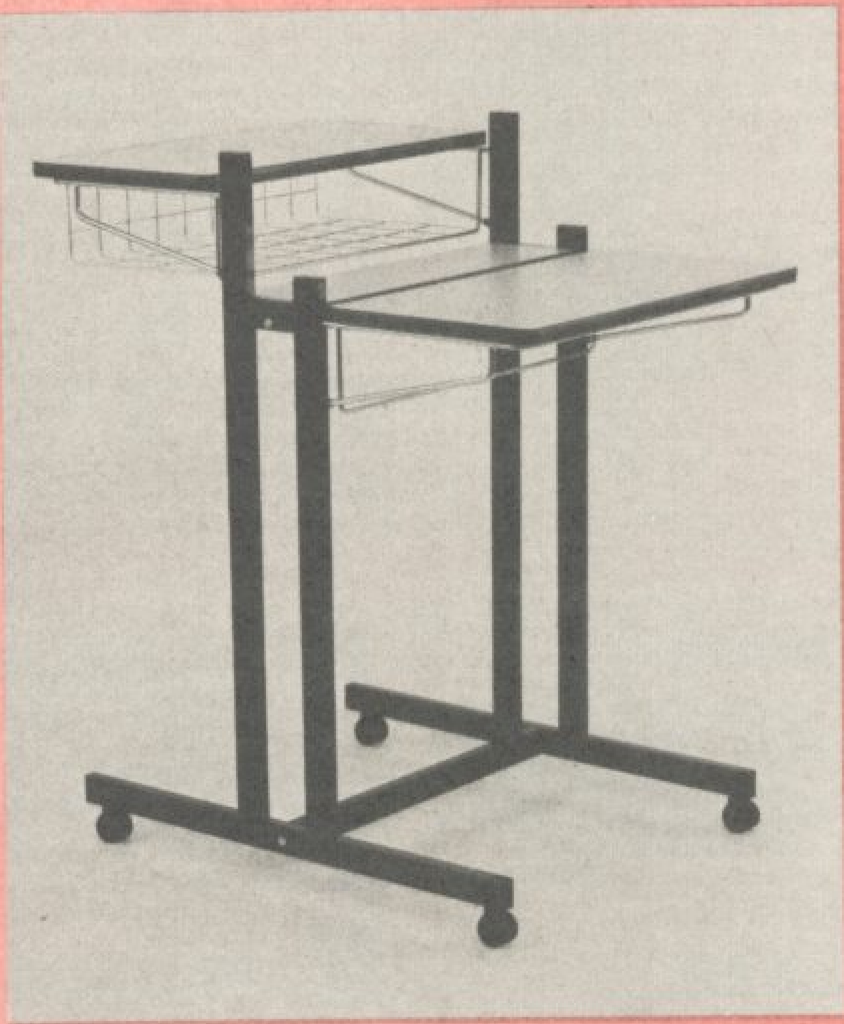
The new disk-based Wordcraft 64, offering the facilities of the world's best-selling word processing program for only £60, will be featured.

Hago Products

The Personal Computer Workstation is a purpose-built unit complete with four-position adjustment for monitor and keyboard shelves, program-holders etc, £62.04.

Saxon Computing

The very successful Figaro database/business graphics program, originally written for the Sinclair Spectrum, has now been adapted for the 64 and will be available, price £86.25 including VAT.



Stack Computer Services Ltd

Two products which, it is claimed, can LOAD and SAVE cassette programs up to seven times quicker than normal, also adding machine-code monitor and Hex calculator/converter, head a range of Stack cartridges for the 64.

Arrow costs £33.95 while SuperArrow, which also includes assembler/disassembler, costs £44.85. Other products include disk compiler (£22.94), Help with 20 additional commands, disassembler and monitor (£28.75) and Superhelp (£40.25).

Supersoft

New games, including Interdictor Pilot, a space simulator written by an RAF pilot, and Star Command, plus, on the business side, the very powerful new Visicalc3. A number of their top games are now available on disk, at £8.95 or less.

Tirith

A range of six Crompton computer desks, workstations and printer stands, all with concealed wiring behind a hinged cable tidy and requiring only one 13-amp connection for up to four devices, will be shown by Tirith. The desks are caster-mounted (glide pads available optionally) and have paper-handling facility.

In each of the past four years Commodore has held a Computer Show in London. Since the first show in 1980 attendance figures have grown from 5,000 to last year's 25,000. This has made it the premier event of its kind; and this year Commodore is "at least 40,000 committed users" at the Shows in London and Leeds.

5,000



1980

12,000



1981

8,000



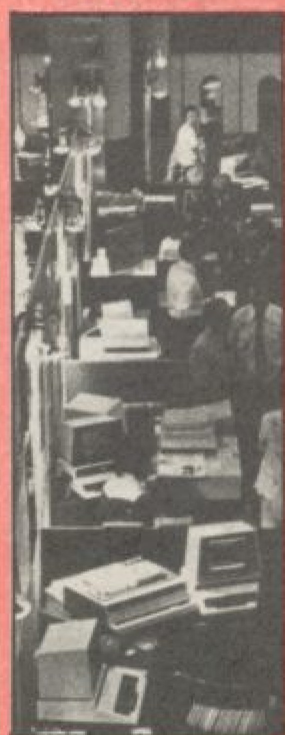
1982

25,000



1983

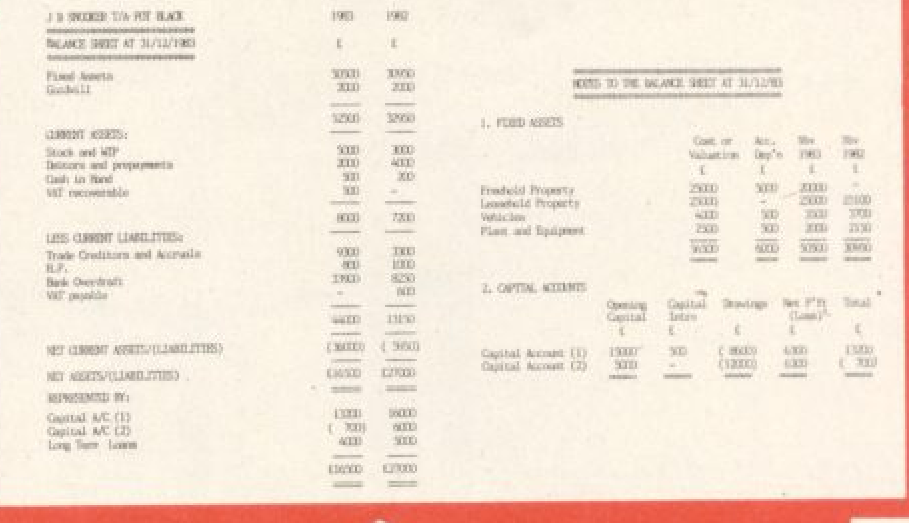
40,000



1984

Gemini

Serious Software



J B SNOOKER T/A POT BLACK	1983	1982
BALANCE SHEET AT 31/12/1983	£	£
Fixed Assets	50500	30950
Goodwill	2000	2000
	52500	32950
CURRENT ASSETS:		
Stock and WIP	5000	3000
Debtors and prepayments	2000	4000
Cash in Hand	500	300
VAT recoverable	500	-
	8000	7200
LESS CURRENT LIABILITIES:		
Trade Creditors and Accruals	9300	3300
H.P.	800	1000
Bank Overdraft	33900	8250
VAT payable	-	600
	44000	13150
NET CURRENT ASSETS/(LIABILITIES)	(36000)	(5950)
NET ASSETS/(LIABILITIES)	£16500	£27000
REPRESENTED BY:		
Capital A/C (1)	13200	16000
Capital A/C (2)	(700)	6000
Long Term Loans	4000	5000
	£16500	£27000

NOTES TO THE BALANCE SHEET AT 31/12/83

1. FIXED ASSETS

	Cost or Valuation	Acc. Dep'n	Nbv 1983	Nbv 1982
	£	£	£	£
Freehold Property	25000	5000	20000	-
Leasehold Property	25000	-	25000	25100
Vehicles	4000	500	3500	3700
Plant and Equipment	2500	500	2000	2150
	56500	6000	50500	30950

2. CAPITAL ACCOUNTS

	Opening Capital	Capital Intro	Drawings	Net P'ft (Loss)	Total
	£	£	£	£	£
Capital Account (1)	15000	500	(8600)	6300	13200
Capital Account (2)	5000	-	(12000)	6300	(700)

FOR THE COMMODORE 64.

Cashbook

Ideal for sole traders, partnerships and Limited Companies ...Written by practising Chartered Accountants...Includes VAT accounting module for users operating the VAT Special Retailers scheme...Accepts data from manual purchases and sales ledgers where necessary...Records all income and expenditure and produces full analytical summaries, Bank and Cash account balances, VAT summary and Trial Balance with full audit trail.

Database

The No. 1 menu driven, user friendly multi purpose Data Management system with the following features: Dynamic Memory management which allows the huge potential of the 64's memory to be fully used... Search and calculate facility which permits numeric field calculations to be updatd by any common arithmetic factor... Searches on multiple selection criteria and high precision sorting... Professional standard record verification prior to entry for greater accuracy.

Final Accounts

Includes Journal entry facility which allows adjustments to be made prior to printing Profit and Loss Account and Balance Sheet...Produces Balance Sheet complete with comparatives or budget figures and notes to accounts... Based on Gemini's well proven BBC Final Accounts program, thousands of which are in daily use, many in the offices of Chartered Accountants... Interfaces with Cash Book when required but also acts as a 'stand alone' program.

Home Accounts

A superb rewrite for the 64 of Gemini's famous program for the BBC — now enhanced with extra features... Budget for all aspects of household and personal expenditure for each month of the year, and then record and compare actual expenditure as it happens... Complete interactive bank account database with the ability to automate standing order debits... Credit cards supported... Full printer options... Graphic plotting facility to display levels and trends of expenses, at a glance... Highly recommended for putting your 64 to serious work!

Gemini software is available from larger branches of Boots, W.H. Smith, and most good software shops. Or telephone Gemini for immediate despatch quoting your Access, Visa or American Express card number. **Telephone (0395) 265165/265832.** Alternatively send your cheque or Postal Order made payable to **Gemini Marketing Ltd.**

Please send the following Gemini Commodore 64 programs:

Cashbook *Cassette* ☐ *Disk* ☐ £59.95

Final Accounts *Cassette* ☐ *Disk* ☐ £59.95

Database *Cassette* ☐ £19.95. *Disk* ☐ £23.95

Home Accounts *Cassette* ☐ £19.95. *Disk* ☐ £23.95

(Please tick boxes as required.)

Name ....

Address ....

....

Credit Card No. .... *Signature* ....

Access/Visa/American Express (Please delete)

***Gemini Marketing Ltd.** 18a Littleham Road, Exmouth, Devon EX8 2QG*

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Gemini

Gemini Marketing Limited

18a Littleham Road, Exmouth, Devon EX8 2QG England

How to get there

Hammersmith is in West London, of course, which makes the place pretty convenient from just about all directions except East Anglia and North East London. Driving there isn't too bad; the public transport services are excellent.

By car

Getting to the Cunard International Hotel can appear daunting and is the subject of numerous apocryphal stories about haggard drivers circulating feverishly around the Broadway looking for a way to it. But in reality it's not too difficult.

The main hotel entrance is in Shortlands, and that's a two-way road connecting Talgarth Road and Hammersmith Road.

Coming from Earls Court and Central London you aim for the A4 and follow signs to Heathrow, Bristol etc until you reach the Hammersmith flyover ... otherwise the next possible exit is a couple of miles further on. So get into the left-hand lane and take the side road signposted 'Hammersmith'; and at the next opportunity, turn right and make a U turn under the flyover. That puts you briefly on Talgarth Road going the other way; Shortlands is the first left.

Coming from Kensington and the West End, drive through High Street Ken and past Olympia. You're then on Hammersmith Road without trying; Shortlands is the last turning on the left before you reach the ugly kingsize roundabout at Hammersmith Broadway.

Coming from the West you stick with the A4 until you're offered the Hammersmith and Shepherd's Bush exit just before the flyover. Again, don't miss it: it's tricky to find your way back again! You follow the slip road on the Broadway, go right round the roundabout past the tube stations, and *don't* aim for Kensington – it might look the obvious route from the map, but there's no right turn into Shortlands from that direction. *Instead* take the next exit signposted 'Central London'. This puts you on to Talgarth Road and Shortlands is the first left.

Coming from Shepherd's Bush and the North you aim for the Broadway, avoid the temptation of the Kensington direction, and follow the Central London sign again with Shortlands the first left.

Car parking is in theory available at the Hotel itself – there's an NCP car park under it – but most of the space is likely to be taken by exhibitors and the Hotel's regular guests.

There are two other decent-sized car parks locally: one is off Queen Caroline Street (get on to the Broadway and take the exit after the Odeon), the other is behind the new shopping precinct called Kings Mall (take the King Street exit from the Broadway and follow the signs around to it – it's about five minutes' walk from the hotel).

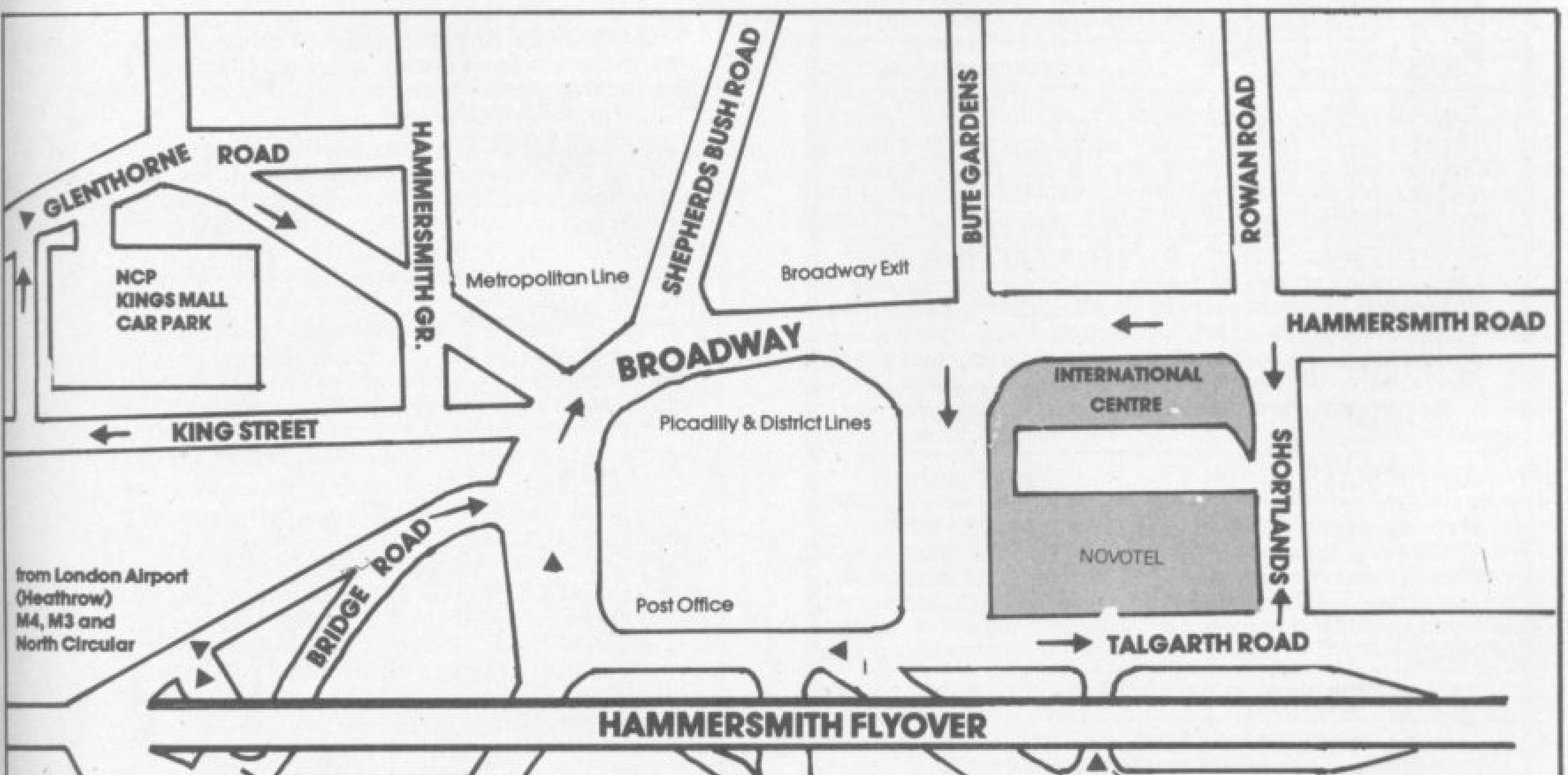
Alternatively you might just be lucky and find a space in some side-street. Your best bet is probably in the maze of streets just North of Hammersmith Road.

By tube

This is the obvious way to come if you live near a *Piccadilly, District* or *Metropolitan Line* station. On the Piccadilly and District Lines you look for the 'Broadway' exit from Hammersmith station, turn right past the Clarendon pub and search for the subway that gets you under the Broadway itself.

The Metropolitan Line exit is on the North side of the Broadway, so turn left and brave the traffic at the foot of Shepherd's Bush Road and try for the island of office buildings which also contains the Cunard.

Hammersmith is served by dozens of buses, too.



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Commodore 64 Video:

Part Five: a lunar landing

by Jim Butterfield

The story so far: we're touring the 6566 chip, which gives the Commodore 64 its video. We have noted the chip goes to memory for its video information, but can only reach 16K; the computer controls *which* 16K bank via the control lines in 56576 (hex DD00). We looked through the video control words at 53248 to 53286 (hex D000 to D026), and then discussed video memory planning. Now let's put it to work ...

Let's write a short program to demonstrate some of the features of the 64's video chip. Here comes a small Lunar Lander program.



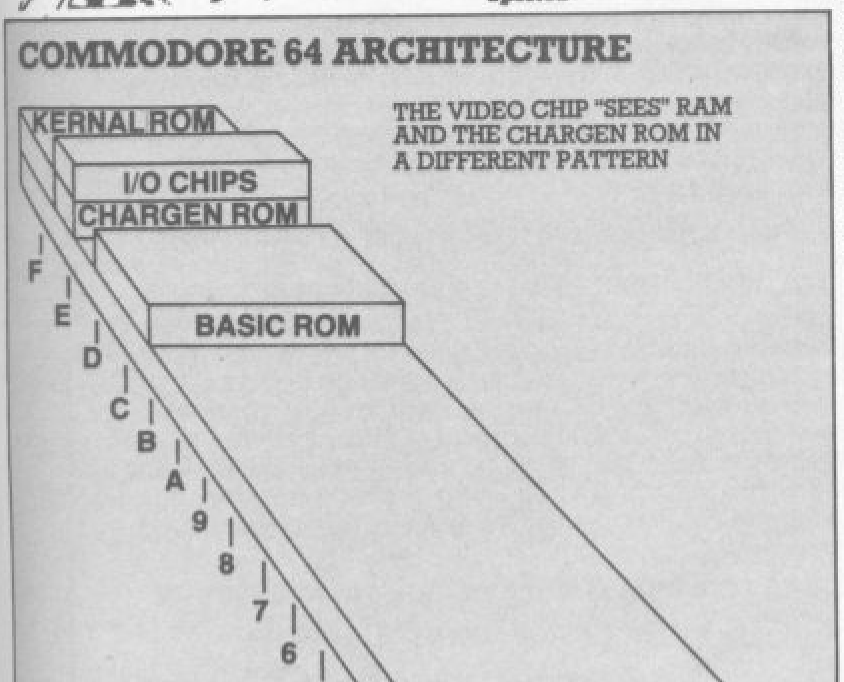
Amazingly, it can work reasonably well in slow, old-fashioned Basic.

First, let's draw the sprites for the rocket ...

```
100 DATA 0,24,0,0,60,0,0,198,0,1,
     131,0,1,131,0,3,1,128,3,1,128,
     3,1,128
110 DATA 3,1,128,3,1,128,3,1,
     128,3,1,128,1,131,0,1,131,0,1,
     131,0
120 DATA 0,102,0,0,126,0,0,0,0,0,
     0,0,0,0,0,0,0,0
```

A fairly crude craft – you can improve it if you like. We have drawn the sprite into 63 bytes of memory; one more and we can continue to the next sprite.

```
130 DATA 0 :REM gap between
     sprites
```



Now we're going to draw the rocket flame as a separate sprite. Why? Because later, when we look for collisions, we don't care what the flame hits – just the rocket. There's another reason: when we're not thrusting, we can simply turn this sprite off and the flame disappears ...

```
140 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
     0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
     0,0,0,0,0
150 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
     0,0,0,0,0,0,0,66,0,0,36,0,0,24,
     0,0,24,0
```

Mostly zeros ... the flame is only at the bottom of the sprite. OK, we're ready to go: let's clear the screen and print instuctions:

```
160 PRINT CHR$(147)
170 PRINT "LUNAR LANDER
     BY JIM BUTTERFIELD"
180 PRINT
190 PRINT "PRESS 'SPACE' FOR
     MAIN THRUST"
200 PRINT "PRESS 'F1' FOR
     LEFT THRUST"
210 PRINT "PRESS 'F7' FOR
     RIGHT THRUST"
220 PRINT
230 PRINT "WATCH OUT FOR
     MINES"
240 PRINT
250 PRINT "LAND GENTLY OR
     YOU'LL BOUNCE!"
```

While the user is reading the instructions, we can read in the sprites and put them into slots 13 and 14. We can also set our sprite position addresses as variables and identify sprites 0 and 1 as using pictures 13 and 14.

```
260 REM set up
270 FOR J=0 TO 126:READX:
     POKE 832+J,X:NEXT J
280 X0=53248:Y0=53249:C0=
     53279
290 X1=53250:Y1=53251:E=
     53269
300 POKE 2040,13:POKE 2041,14
```

We'll make the rocket exhaust go 'behind' the main screen. This way, as we land the exhaust will go behind the background. We'll also give it colour to distinguish it from the rocket ship itself (you may pick your own) ...

```
310 POKE 53275,2
320 POKE 53288,3 : REM thrust
     colour
330 PRINT "READY TO START"
340 X$="Y":INPUT X$
```

Variable E is used to enable the sprites. When we're ready, we'll turn them on; for now they can stay off.

```
350 POKE E,0
360 IF X$<>"Y" AND X$<>
     "YES" THEN END
```

We're ready to fly. Let's put the sprite high on the left part of the screen. Then we'll draw a screen with 'mines' for the player to avoid.

```
370 V=100:H=100:V0=0:H0=0
380 POKE 54296,15:POKE 54278,
     240
390 REM draw screen
400 PRINT CHR$(147)
410 FOR J=1 TO 18:PRINT:
     NEXT J
420 FOR J=1 TO 4:FOR K=1
     TO 30
430 C$=" ":IF RND(1)<.1 AND
     (K<20 OR K>25)THEN C$=
     "#"
440 PRINT C$;:NEXT K:PRINT:
     NEXT J
450 FOR J=1 TO 30:PRINT"=";:
     NEXT J
```

Let's place the sprite, and start the main play by checking the keyboard. We check for two different things – a new key (K$), or an old key still being held down (K):

```
460 POKE X0,H:POKE Y0,V:
     POKE X1,H:POKE Y1,V
470 K=PEEK(203):GET K$
480 REM main flight loop –
     test keys
490 IF K$="" GOTO 550
500 K0=ASC(K$):V1=.1:H1=0
```

Let's check for the space bar: if it's on, we want to energize the rocket and the rocket flame. Our vertical thrust will be upwards (−.5), and we'll note that we will want to enable the flame video with a note that E0=3. We'll spot lateral thrust as keys F1 and F7, and set value H1 accordingly.

```
510 E0=1:IF K0=32 THEN V1=
     -.5:E0=3
520 IF K0=133 THEN H1=-.2
530 IF K0=136 THEN H1=.2
540 GOTO 560
550 IF K=64 THEN V1=.1:H1=0:
     E0=1
```

Here's where we turn on our sprites: either rocket only (E0=1) or both rocket and flame (E0=3). As long as we're turning rockets

6566 Video – Sprite Registers

Sprite 0	Sprite 7	Register		Sprite 0	Sprite 7
D000	D00E	Position	X	53248	53262
D001	D00F	Position	Y	53249	53263
D027	D02E	Colour		53287	53294

Sprite bit positions

7 6 5 4 3 2 1 0

Register	Function	Decimal
D010	X-position high	53264
D015	Sprite enable	53269
D017	Y-expand	53271
D01B	Background priority	53275
D01C	Multicolour	53276
D01D	X-expand	53277
D01E	Interrupt: sprite collision	53276
D01F	Interrupt: sprite/background collision	53279

6566 Video – Control and Misc. Registers

Register							Decimal
D011		Extend Colour	Bit Map	Display Enable	Row Select	Y-scroll	53265
D012	Raster register						53266
D013	Light Pen input X						53267
D014	Light Pen input Y						53268
D016		X	Reset	Multi-Colour	Column Select	X-scroll	53270

Register	Bits 7–4	Bits 3–1	Bit 0	Decimal
D018	Screen (Video Matrix) vm13, vm12, vm11, vm10	Character Base cb13, cb12, cb11	X	53272
D019	IRQ, IRQ sense	LP, SSC, SBC	RST	53273
	IRQ enable	Light Pen, Collision Sprite, Back	Rastr	53274

Colour Registers

Register	Function	Decimal
D020	Exterior	53280
D021	Background no. 0	53281
D022	Background no. 1	53282
D023	Background no. 2	53283
D024	Background no. 3	53284
D025	Sprite Multicolour no. 0	53285
D026	Sprite Multicolour no. 1	53286

on and off, we might as well add sound effects, too:

```
560 IF PEEK(E)=E0 GOTO 600
570 REM thrust sound
580 POKE E,E0:IF E0=1 THEN
    POKE 54276,0: GOTO 600
590 POKE 54273,8:POKE
    54276,129
600 IF H1=H9 GOTO 630
610 H9=H1:K=SGN(ABS(H9))*
    129:POKE 54273,99:POKE
    54276,K
```

Gravity, thrust, or lateral thrust – they all represent acceleration. We add acceleration to our speed to get new speed; then we add speed to position to get new position.

```
620 REM let's move it!
630 V0=V0+V1:H0=H0+H1
```

To prevent the player going off screen, we'll invent a 'field force' around the screen boundary. If you hit it, you'll bounce – that is, your speed will flip to the opposite direction.

We'll fudge a bit. The 'high bit' of the X position is tricky to set in Basic; there's often a flicker during the moment that we set the low and high values. So let's limit the player's travel to the left-hand three quarters of the screen and avoid the problem.

```
640 REM field force boundaries
650 IF V<50 THEN V0=ABS(V0)
660 IF H<20 THEN H0=ABS(H0)
670 IF H>240 THEN H0=-
    ABS(H0)
680 V=V+V0:H=H+H0
```

We move the craft simply by changing its coordinates. Then we check the collision register to see if we've hit anything.

There's a problem here. It seems that collision is noted when the screen is drawn, not when you set the coordinates. Basic isn't super-fast, but it could be fast enough to miss that collision. If you watch the program closely, you will see that the rocket sometimes 'bounces' after it goes below ground level.

There's something else that contributes to this: Basic, being slow, may need to move the rocket several pixels in distance at a time. So rather than just touching the ground and stopping, the rocket may also leap from just above the grounds to well into it ... if it's going quite fast.

```
690 REM move craft, check
    collision
700 POKE X0,H:POKE Y0,V:
    POKE X1,H:POKE Y1,V
710 C=PEEK(C0):IF(C and 1)=0
    GOTO 470
```

Collision says we've hit something. We can look at our height (Y position) to see if it's the ground. If not, it must be a mine.

```
720 IF V>218 GOTO 780
730 IF V+V0<218 GOTO 470
```

We *could* do a sensational explosion here – but we'd need to define more sprites, or modify the one's we've got. Try your hand at it if you like. For the moment, hitting a mine will cause the rocket to disappear.

```
740 REM we seem to have hit a
    mine
750 PRINT CHR$(19);
    "CRASHED!":POKE E,0
760 GOTO 820
```

I decided arbitrarily to make the craft bounce if it hits too fast. If you'd rather crash, go ahead and do your destructive thing. See the previous note.

```
770 REM hit the deck ... too fast?
780 IF V0>1 OR V0<0 then V0
    =-ABS(V0):GOTO 470
790 PRINT CHR$(19);
    "LANDED!":POKE E,1
```

Because we may overshoot the ground and dig a little hole, we'll reset the vertical position of a successfully landed rocket to look neat. Then we wind up the game or play another one.

```
800 POKE Y0,219
810 REM all done – shut down
820 POKE 54276,0:POKE 54296,0
830 PRINT "WANT TO TRY
    AGAIN";
840 GOTO 340
```

That's it. There are many features you can add – such as a fuel supply.

We could also have done a pretty background in high-resolution graphics; but this would make it difficult to add features (if you wish) like meter readouts. In fact, I've used very dull graphics ... you may consider that a challenge.

We've done a simple sprite exercise. It's really not hard, even in Basic. In machine code it's almost too easy; you'll find that you need to slow your program down or everything will happen too fast.

Graphics is there, and it's not hard to use. A little experimentation and practice ... and you can animate a picture that's worth a thousand words.

Next time, we'll talk about using the interrupt for 'split screen' effects. This allows us to do some new things; we can even begin to break some of the rules we've previously set down.

TOMMY'S TIPS

Tommy is Commodore User's resident know-all. Each month he burrows through a mountain of readers' mail and emerges with a handful of choice queries. The result, before you, is a wadge of priceless information and indispensable advice. There's even the odd useful tip as well.



Dear Tommy, Just before Christmas I sold my Vic 20 and bought the Commodore 64 and 1541 disk drive. I was pleased with both and the disk was a lot easier and faster to use than the tape which I had with the Vic. The trouble now is that I have been looking for some software on disk for the machine and it seems to be very hard to find. Looking through the Vicsoft catalogue and *Commodore User* I found that nearly every program was either on tape or else no details were even given of the medium used – I actually only found one firm which did a game on disk for the Commodore 64. That is not much of a choice when looking for software.

Please could you tell me generally about the availability of software on disk? I want to know whether I need to buy a Datassette as well to have access to a reasonable selection of software.

On the subject of disks, could you tell me if the disk drive's red light is supposed to flash occasionally after the loading has begun? And are the clicking sounds which occur during loading normal? As you know the drive manual does not answer such questions.

If you think about the comparative sizes of the market for cassette based games you will realise why there are so few disk based games around. Only a small percentage of Commodore users will have disks; nearly 100 per cent (excluding yourself) have cassette recorders. No software house is going to restrict the potential market for their software, nor produce a more expensive product that is not going to move well.

Much of the business type of software such as word processors is on disk because it is difficult to use without having a disk to store all the data on. Games are a very different matter; and it is probably true to say that if a supplier does not state which medium the software is on, it is probably available only on cassette.

Having said that, you could always try writing to the software suppliers in question: they may be prepared to supply a game (or even games) on disk if asked; be prepared to spend more than the equivalent cassette version though – disks cost a lot more than cassettes. I realise that £40 plus seems a lot to pay for a recorder when you aren't going to use it that much, but for the full range of games software there really isn't much choice.

With regard to the little red light on your drive; the flashing and the clicking normally indicate that the read head is searching for the next sector of the disk where the program is stored and is quite normal. However, if this occurs a lot it probably means that your files are scattered about on the disk making the reading very inefficient. Doing a 'Validate' will reorganise the program and data storage and reduce the head movement when loading a file. *(See the disk games review in this issue – Ed)*

Dear Tommy, A number of technical questions for you first, can't you (or somebody else) please write us plebs a pretty utility to dump a hi-res screen to printer? The Koalapad produces the most fancy graphics you want, but you cannot print them. The difference between a novelty drawing program and a useable, professional graphics package is precisely the ability to produce prints. Maybe it could be hidden away in the cassette buffer, WAITing for the "P" key to produce a print? ... (hint, hint...)

Second, I am using a Stack Motherboard to keep my cartridges semi-premanently plugged in. This causes a problem: when you switch on, the Kernal start-up routine checks to see if anything has been plugged in and passes control to the relevant ROM. If all the ROMs have been switched out, however, some stupid little switch is still set somewhere. This means that if I want to use (say) Easy Script (which apparently uses the same address), I must unplug the Motherboard before I load the program.

The million dollar question is this: surely there must be some clever way of fooling the 64 and the program that nothing has been plugged in? After all, the Motherboard is dead when all the ROMs are switched out, so there cannot be any conflict.

Building on question 2, surely there is a way software-wise to 'switch off' the 64, giving me time to switch my ROMs? How about a little program (combined with the hi-res dump?) that allows one to do all this? Or am I now a typical user?

With regard to your first query, you don't say which printer you are using; a 'general purpose' routine is a little more difficult to write, although not impossible – keep your eyes peeled for an Epson dump routine in the (hopefully) not-too-distant future.

As for the Motherboard problem, I was caught in exactly the same way. The problem is that it is not just a question of turning off the power to the cartridge, but disconnecting the EXROM and GAME lines as well. This involves fitting a DPDT switch on the board which will 'break' these lines if no cartridges are to be selected.

Stack says that the board is designed to be removed if you want a 'no cartridge' situation; but the company is also prepared to fit the necessary switch to the board for £5 plus £1.50 p&p. Presumably anyone intending to buy a board can ask for the modification to be done before sending off at a cost of just £5 extra.

If you wish to do the mod yourself you must break the two lines near the gold contacts on lines 8 and 9. Connect wires from the back of the contacts (ensuring you allow the board to seat in the socket correctly) to a DPDT switch at the back of the board somewhere; then connect from the other side of the switch to contacts 8 and 9 on the nearest socket.

On your last question, the answer depends on whether you just want to change cartridges that are already plugged in or to add a new cartridge to the board. If it is the latter then the answer is no; you must power down before adding or removing any cartridge.

If however you wish to swop ROMs that are already plugged in, try this: switch off the current ROM, switch on the required ROM and momentarily connect pins 1 and 3 on the User port. This will have the effect of doing a cold start without affecting any data or machine code in memory, although the Basic pointers are reset. You can set up the reset switch permanently, or wire up a user port connector with a small push-switch attached.

The reason you can't do a software cold start is that switching ROMs with the power on sometimes causes a crash; the hardwear reset will always work. (Note that the switch must be a non-latching type.) It is also expedient to point out that there is a faint chance that you may damage a cartridge by switching it with the power on – unlikely, but you must assess the risk against the need.

Dear Tommy, I have a few 64 questions:

a) At what address does a Basic program start (i.e. after you've LOADed it?)
b) How can I find the end address of a Basic program using a monitor?
c) If I LOAD "PROGA",8,1 how can I find the starting and ending addresses?

A Basic program normally starts at location 2048. You can find the start address by this statement:

PRINT PEEK (43)+PEEK(44)* 256

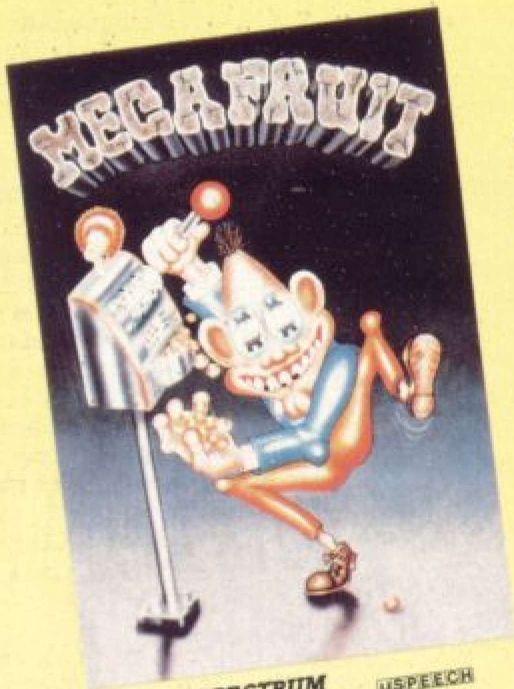
Similarly, the end address is given by:

PRINT PEEK(45)+PEEK(46)* 256


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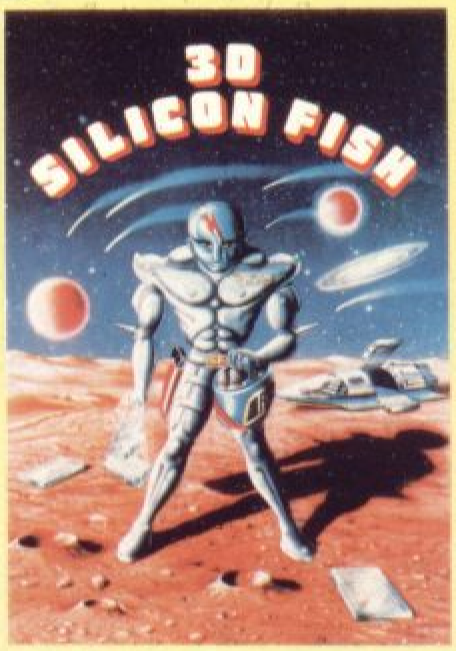
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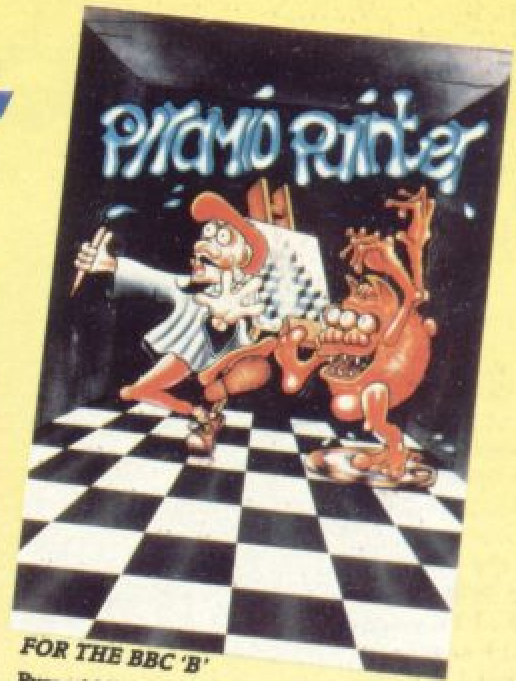
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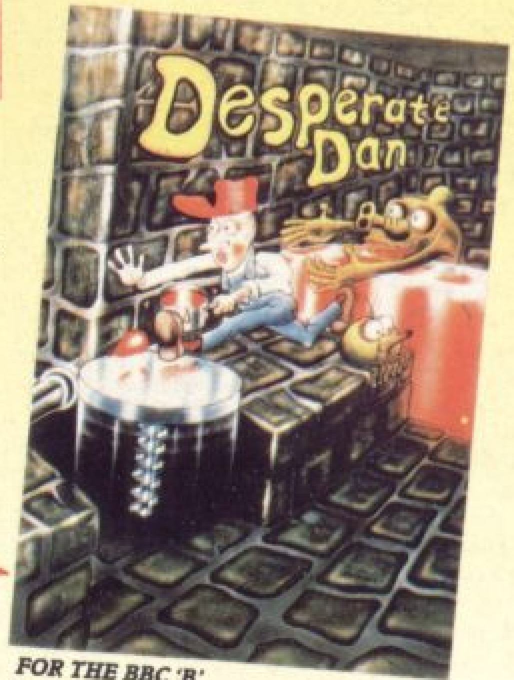


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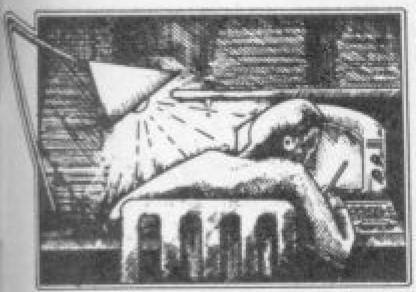
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Dear Tommy, I have recently acquired a Commodore 64 computer and being completely new to computers I need a little advice. The questions I have are on POKEing and PEEKing in general. Having tried the program in the user manual on creating the balloon sprite POKEs 2042,13 I altered it to POKE 2042,10; of course nothing happened, and I lost the CLR/HOME function and could not restore the screen without switching off the computer.

What I want to know is have I disturbed anything in the computer: and how do I know where to poke and where not to poke: and what does the 13th area of memory actually refer to in this program? Also, how do I actually use the PEEK command?

One of the problems with POKEing is that the computer will happily allow you to change all sorts of vital memory locations without any warning of the disasters which can befall you. But, the first thing to point out is that you cannot damage anything inside the computer – although you may well have to switch off and then on to reset the computer, thus losing any program in memory.

With regard to your specific problem, each sprite needs 64 bytes of memory to define it; but this can be anywhere in a 16K block of memory. The locations 2040 to 2047 are known as the Sprite Data pointers; they tell the computer where the sprites have been defined. In your case location 2042 indicates where the data for sprite 0 is held.

To find the actual address (assuming the screen area has not been moved), you need to calculate the start address of sprite data as X * 64, where X is the number to POKE into 2042 (or another sprite pointer location). Thus POKEing 13 means that the sprite data is held in the 64 locations at 832 to 895, which is in the cassette buffer. By POKEing 10 you have told the computer to put the sprite data into locations 640 to 703, which happens to be a rather vital part of the Operating System area; hence your rather dramatic crash! To be completely safe, only POKE values between 13 and 15 (which all use the cassette buffer) or values between 192 and 255 (if you have moved the top of memory pointers first with POKE 56,48: POKE 55,0: CLR). The latter method will give you plenty of room for sprites, but will cut down your program area somewhat.

To really find out where you can and can't POKE, I recommend that you purchase either the *Programmers Reference Manual* which gives a full memory map or one of the many books available on the 64 which gives the same information.

As for the PEEK command, the syntax is as follows: **X+PEEK (2042)**. This will make X equal to whatever value is contained in address 2042. In short, POKE puts a new value into an address: PEEK reads the value contained in an address.

Dear Tommy, I have a Vic with one 8K and one 16K cartridge. How do I use them together?

When using both an 8K RAM and a 16K RAM pack, the links inside the 8K cartridge must be altered to fit the RAM into the third block of expansion memory. This is because 16K always fits into blocks 1 and 2 in the memory map and cannot be altered.

To change the links on a Commodore RAM pack, open the cartridge by undoing the Philips screw in the bottom of the unit; then use a very fine screwdriver to unclip two small plastic lugs in the rear of the case. You must then ease the case apart, trying to disengage the front lugs without breaking them (that's the difficult bit). Having opened the case you will see a small switch-bank with four switches; no.1 will be ON and the rest will be OFF. To change the RAM to fit into block 3, turn 1 OFF and turn 3 ON (if you have two 8K RAMs you can turn 2 ON to fit one of the cartridges into block 2). Finally, fit the case back together, not forgetting the screw. A word of warning: make sure only one of the switches is ON at any time – otherwise the cartridge will not function correctly.

For those who like to experiment, setting switch 4 ON will fit the RAM into the ROM area starting at 40960 (A000) giving you an 8K area for machine code or data (but not Basic programs, I'm afraid).

Dear Tommy, I would be grateful to you for some advice on the use of a disk drive with the Vic 20. It seems that with the slow cassette operation on this computer that the loading of programs, especially of 16K, can be very tedious indeed. One would imagine therefore that the obvious solution would be a disk drive. Since very little software is produced on disk for the Vic, clearly programs – including those produced commercially – would need to be transferred to disk for it to be worthwhile contemplating such a large purchase.

It is therefore very surprising to me that I have never seen any articles dealing with this matter, regarding either feasibility or advice on how it may be done. Could you deal with this in one of your future columns?

There are a lot of points raised in this letter! The simplest case is copying one of your own Basic programs which does not use any files once it is running. All you have to do then is to load it from the tape deck and save it on to the disk.

The same applies if you use assembler programs – except that you need a machine-code monitor to save assembler programs properly, but if you are already writing programs in assembly language you will know all about that.

If your program uses data files, or loads other programs, then every file access has to be changed from device number 1 (the tape unit) to 8 (the disk). There are a few extra things which have to be done as well, because opening a data file on a disk is not quite the same as on the cassette deck. But once you have bought your disk drive and learnt how to use it, all that side will become easy.

Your problems start, though, if you want to transfer a commercially-produced program to disk. For a start it may be protected, in which case transfer (like any other form of copying) will be quite difficult (practically as well as ethically). If the program is *not* protected, you will be able to copy it to disk; but if it uses data files you will be faced with the task of changing the program to use disk files rather than cassette files.

Many software producers will swap a tape version of a program for a disk version, usually for a small fee ... which may not be so small if, as often happens, the disk version is more powerful than the tape version. But then there may not be a disk version available, which is especially the case for games programs.

To sum up, transferring a number of programs to disk could well be a tedious job; and this task has indeed to be taken into consideration when weighing up the pros and cons of moving on to disk.

Dear Tommy, For almost two years now I have been using the Vic-20 and I still find its keyboard very fine to work with. Some keys tend to 'bounce' though: when I type a single character, two of them appeared on the screen. I wonder whether this is caused by dust (shame on me: I never used a dust cover) or could it be something in the hardware? Anyhow, do you happen to know a cure for this?

This problem is fairly common on all Commodore computers, and is indeed caused by dust getting down in between the keys.

Fortunately, it is fairly easy to fix. First of all, unplug everything – especially the power lead. If you turn your Vic upside down and undo the three small screws holding the top and bottom halves of the vic body together, you will be able to lift the bottom off. There are two cables which need to be undone before the two parts will separate completely. One is the keyboard itself, the other goes to the 'POWER' LED. Make sure you remember where they come from, and notice that you must make a note of which way round the LED cable was pluged in!

Now on the brown back of the keyboard you will see a number of very small screws. If you undo these (and put them where you won't lose them), you can lift off the back of the keyboard.

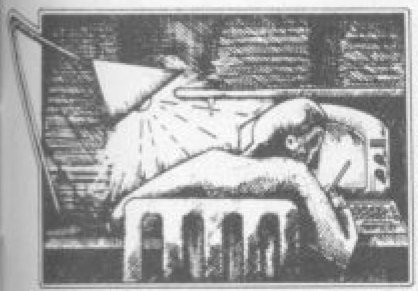
Wipe the contacts with a clean cloth, making sure it doesn't leave bits of lint inside the keyboard; that should fix the problem. If not (or if you don't feel confident about ripping your Vic apart), then it is back to the jolly old Commodore dealer with it.

Dear Tommy, Is there a way of using the INPUT statement that removes the question mark which automatically follows it?

There is indeed – a couple of ways, in fact, but this is the simplest: use INPUT# having previously OPENed the keyboard (which is device number 0). So you might have something like this:

```
100  OPEN 1,0: PRINT "INPUT
     IS": INPUT# 1, A$
1010 PRINT "[and]"A$
1020 CLOSE 1
```

Tommy's Tips



Dear Tommy, Please could you help me with a very annoying bug which is occuring on my 29K Vic-20. I have been trying to run a 24K program but it persists in crashing with a NEXT WITHOUT FOR error at the same point. As it is happening in a small loop this does not seem possible. Before this, however, it has read 87 DATA statements and performed over 200 GOSUB RETURNs with numerous loops.

I have carried out tests but there are no NEXT or RETURN statements missing. If I get round this bug the program physically slows down then crashes with an OUT OF MEMORY error even though there are 4K bytes unused. I have a sneaking suspicion that the stack is overloading and that this is where the problem lies.

Could you please advise me whether I have a hardware failure? Or how I can reset the stack and pointers, if this is the area that is causing my troubles?

It is extremely unlikely that this is caused by a hardware fault. This sort of problem is always caused by either jumping out of a FOR-loop or a subroutine, nearly always the former. The only safe way to leave a FOR-loop before it has finished is this:

```
100  FOR I=1 TO 100
110  ...
120  IF ... THEN I=100: GOTO
140
```

If you just jump straight to 150 you are asking for trouble. The problem is that this may not have any effect until much later in the program, when it is next to impossible to find out where the original problem lies.

If you get an OUT OF MEMORY error when FRE(0) shows that there is still plenty of free memory available, you are jumping out of a subroutine instead of using a RETURN. This is normally easier to find than the first problem.

The best solution to both problems is tidy programming. Each FOR-loop should have only one NEXT statement; if there are several places where you want to do a NEXT, then jump to the one and only NEXT statement. Similarly, each subroutine should have only one RETURN. You should never jump out of a FOR-loop or a subroutine: If you do, the result can be chaos!

It is not possible to reset the processor's stack pointer from Basic, by the way.

Dear Tommy, Could you please explain the purpose of the memory locations 36880 – 37135 on the Vic-20 computer. What can be done by POKEing into this region? *The Vic Revealed* and *Mastering the Vic-20* do nothing to explain this area.

I'm afraid that POKEing into this area will not achieve much because there is nothing there! This is just an empty bit of memory in between the VIC chip and the first PIA.

***Dear Tommy*, I recently discovered that by pressing the CTRL key and R, reverse graphics could be obtained on my Vic-20. What's more, it works within quotation marks. I had always thought that the only way of obtaining reverse graphics on the Vic was to press CTRL and 9 together. Have I made a new discovery?**

This is just a little quirk in the way the Vic looks at the keyboard. Both CTRL-9 and CTRL-R in fact produce the same character, CHR$(18).

Letters

Write away

This is your page: normally we write for you, but here we listen. Feel free to let us know what you think – about the magazine, about Commodore, about suppliers, about life, art, the meaning of existence or whatever. We don't print everything we receive, of course; but anything that might be of specific relevance or general interest will make it to these pages.

Insights

Do owners of the Commodore VICMON machine-code monitor realise that there is an extra command available but not listed in the instructions?

It is a compare command to compare blocks of memory. Syntax is as follows:

.C(start), (end), (start2)

... where start/end are the memory locations which will be compared with the memory beginning at start 2. For example, to compare $2000 to $4000 with $9000:

.C 2000, 4000, 9000

The memory locations which do not match correctly will be printed on the screen.

Another unique discovery? Try this:

```
1  POKE 157,64
2  FOR A+1 TO 11: OPEN A,3:
   NEXT
```

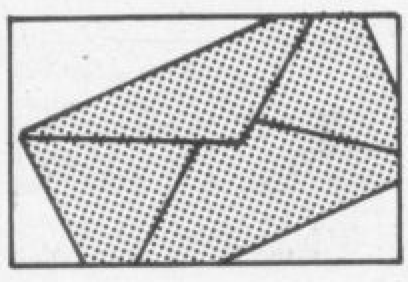
It works for both the Vic and 64! I had always wondered what the "I/O ERROR#" error message was for and finally I discovered how to generate it (only in a program, not in direct mode). The numbered display corresponds to the table of error codes on page 210 of the Vic *Programmer's Reference Guide* or page 306 of the 64's.

Why is this message in ROM? Does anyone know? Perhaps it was for debugging purposes.

Try these alternative line replacements.

```
2 OPEN0,0
  or
2 OPEN 14,14
  or
2 OPEN 1,3: OPEN 1,3
  or
2 LOAD "",8
  or
2 LOAD "",2
  or
2 OPEN 1,0: CMD1
  or
2 CMD 1
```

Kevin Smart, 13 Norman Crescent, Irvine, Ayreshire.



Alternative hi-res

I have just read Commodore User and noticed that you answered someone's question on how to create high resolution graphics on an expanded Vic. I have an alternative method which leaves the screen the same size and leaves either 8 or 10K:

```
10  POKE 43,1: POKE 44,32:
    POKE 8192,0
20  POKE 641,0: POKE 642,32
30  POKE 648,30: POKE
    36866,150
40  POKE 36869,240
50  PRINT "(clear screen)";
```

This should be used as a short loader, not in the main program: but it is very quick and does the job perfectly. The following lines will automatically load the next program:

```
60  POKE 631,76: POKE 632,111:
    POKE 633,13
70  POKE 198,7: NEW
```

It is then possible to carry on as though you are using an unexpanded Vic – but don't poke 51, 52, 55 or 56.

I hope you publish my tip as I had a lot of bother figuring it out and it might be useful to someone!

Richard Iken, 14 Stratford Drive, Aldindge, Walsall, West Midlands WS9 8LS

Cash Traders

Thank you for your detailed and workmanlike review of the above product. Some months have elapsed since we sent you the review copy – understandable in view of the thoroughness with which your reviewer carried out his task – and we have made some enhancements.

The user can now record both purchases made on credit and subsequent payment with discounts taken. There is an appendix in the user guide listing the pre-set nominal accounts. The system is now available on both disk and cassette and is still priced at £78.00 plus V.A.T.

Arnold L Shaw, Quick-Count Ltd, 15 Neeld Crescent, London NW4

Disk device no. switch

We are getting an increasing number of enquiries from those wanting to use two 1541 disk drives with the Commodore 64, and I wonder whether I might help those of your readers who are struggling with Commodore's incorrect instructions on converting one drive to device number 9 instead of 8.

Take no notice of steps 5, 6, 7 and 8 on page 40 of the disk drive manual. The metal housing referred to does not exist in any of the 1541 drives we have seen, and nor do the jumpers allegedly "... on the left edge in the middle of the board". Instead, locate two small white circles in the approximate centre of the board which carry no numbers or identification. Inside each is a narrow track joining two semicircles, and these are the jumpers.

In true Commodore style, if you put the board the correct way up as indicated by the various printing on it, the order of the jumpers is not '1,2', but '2,1'. So in order to change the device number to 9, cut the track in the circle nearer the front of the disk drive. Cutting the other will change it to 10, or both will change it to 11. A touch of solder will take care of any changes of mind.

Be warned, though, that you will need a special utility even to make a security copy from one to the other. This has apparently sometimes been supplied with drives recently, but perhaps only by dealers who have written their own. Also, there is almost no software yet which operates with two single drives, as opposed to a true dual drive using drives 1 and zero on the same device number. We have just made small revisions in our *Simply File for 64* database system to allow its use with two single drives as well as dual drives, and will be happy to advise existing or new users. Our *Simply Write* word processor could already be used with dual or paired-single drives.

Brian Tregar, Simple Software Ltd, 15 Havelock Road, Brighton, Sussex BN1 6GL

Pocket money

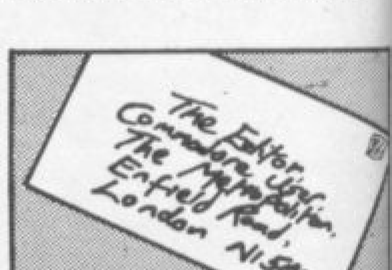
I am annoyed to see that your latest Commodore magazine has no programs for the Commodore 64. Please could you put more programs in for the 64. I am twelve and buying the Commodore magazine takes up most of my pocket money and to find no programs makes me disappointed.

Andrew Taylor, Weald cottage, 36 Millbank, Headcorn, Kent.

Logos

In response to Mr. W.J. Howard's letter in the March 1984 issue may I bring a Vic LOGO to your attention. It is called 'Turtle Graphics' and is produced by HES. I have had it for a few months and it is very good. It is supplied as a cartridge with a 72-page manual. The UK distributor is Maplin Electronics. A 64 version, 'Turtle Graphics II' is also available.

F. Weil, 112 Quakers Lane, Potters Bar, Herts, EN6 1RG.



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*







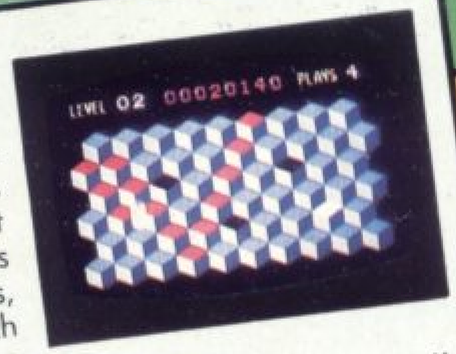
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*

SLINKY

Slinky, the spring, was having fun hopping about when suddenly he came upon a pile of coloured blocks, so he thought he'd play around on them for a while. Much to his amazement he found that they changed colour when he landed on them. Wow! But unknown to him, the blocks belonged to the Wicked Wizard, who sent his friends along to tease our poor hero. Slinky is a real fun package with ninety-nine levels, amazing reward displays, and action replays. Where else could you meet such charming characters as Dusty the dust cloud, Marge the magnet, Ralph the random raindrop, and Lorenzo the chameleon hopper?



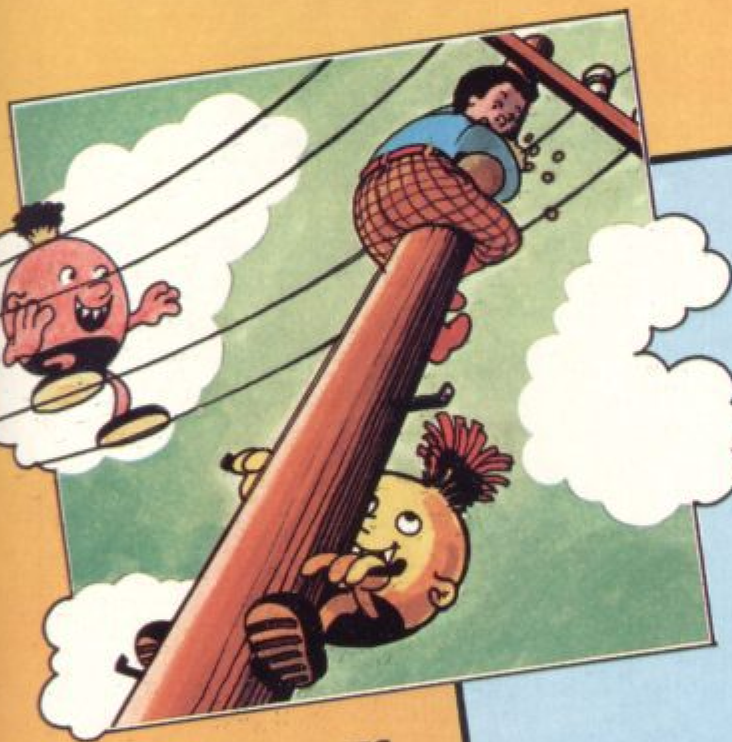
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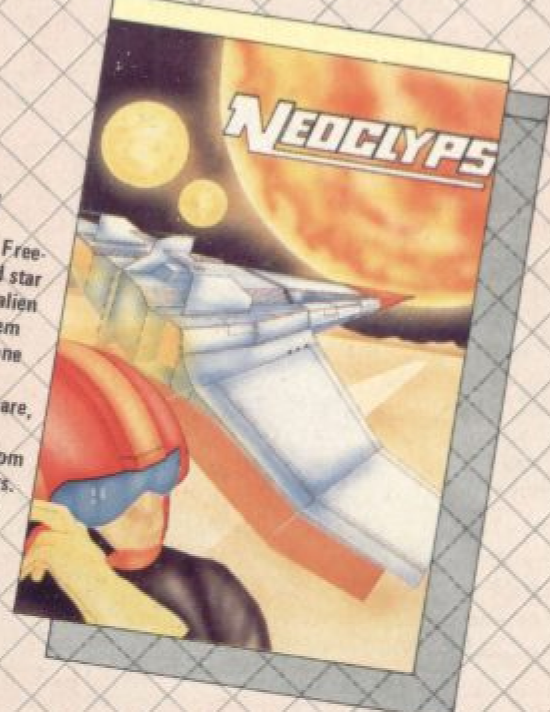
The object of this game is to blow up submarines, destroy the helicopter and catch the falling pilot, but do not kill the whale.

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Neoclyps

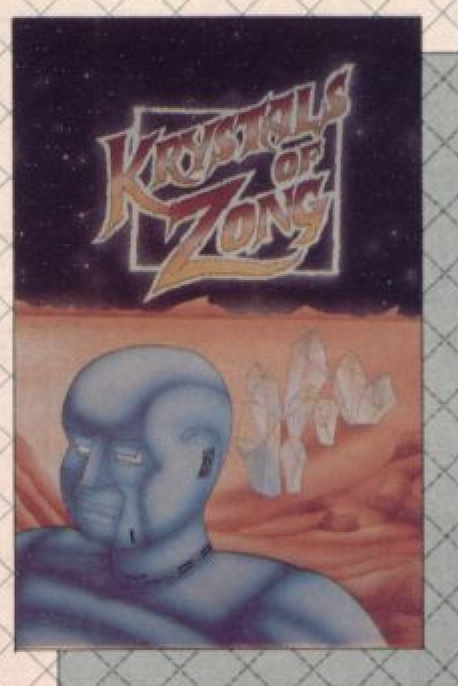
You are the GOOD GUY, Freedom Fighter and renowned star pilot. The BAD GUYS, an alien race from distant solar system have invaded NEOCLYPS, one of your colonial planets. Being the good guy that you are, you set off to liberate the Common Folk of Neoclyps from the oppression of the Bad Guys. The Bad Guys have populated Neoclyps with several radar towers which reveal your position to them.

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Pan pipes

We have recently seen the letter from Mrs Carter of Waltham Abbey, Essex printed in your April issue. I'm glad to enclose a copy of my reply which explains about what happened.

It would be most helpful if you could inform your readers of what has happened and also to tell them that if they bought a copy of *60 programs for the Commodore 64* in December, January or February they should tear out the title page (it's the first page of the book) and mail it together with their name and address to Elizabeth Kinnell, Pan/PCN Computer Library, Pan Books Ltd., Cavaye Place, London SW10 9PG. We will immediately replace the defective copy with a revised edition.

D.M.R. Kewley, Director, Children's and Educational Publishing, Pan Books Ltd., Cavaye Place, London SW10 9PG.

The letter in question mentions that Pan discovered in early January that the book was defective and immediately withdrew it from sale. "Our customers, the bookshops, were all notified of this fact and asked to return existing stock to Pan. We also notified them to advise their customers to return their faulty copies to us through the procedure of tearing out the first page of the book and sending it into our office. We undertook to replace all defective copies notified to us either through the booktrade or through this direct method."

The fault lay with the printer used to print the programs, says Pan. All the programs were checked on a screen then dumped on to printout. "Unfortunately, and we believe uniquely, the printer we used had a defective memory chip which caused it to print out incorrect characters at random. As the programs had all been checked on screen and no-one had ever come across a printer which didn't print out exactly what the computer instructed, the print-out was not checked character by character. It was only when customers started to have problems with programs that had worked perfectly well for us that we realised that something was at fault ..."

Anything you Karn do

Help! Does anybody out there know how to find the word or meat or get out of the dungeon in *Heros of Karn* written by Interceptor Micros? Please write to the magazine and the letter might be printed. This game is driving me crazy, so please help ...

By the way, it's a brilliant mag: but it should have an Adventure page as lots of people play and write adventures!

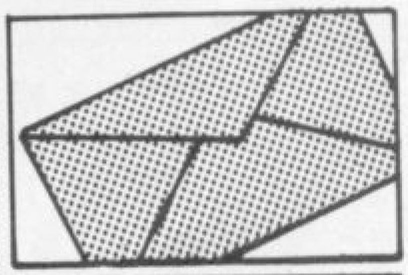
Simply brilliant mag: keep up the good work.

Stephen Oliver, 20 Chacombe Road, Middleton Cheney, Nr. Banbury, Oxon.

On Softchip

Glad you liked the Softchip-64 ... can't resist writing on one thing though, it *is* true about the Basic INPUT# accepting only lines shorter than 89 characters, not 80 as on Pets. This I suppose is due to the Vic being developed first and then the chap who changed it for the 64 not remembering he had two lines of 40 characters again *not* four lines of 22. I'm sure this is one of those things Commodore chaps forget as easily as the rest of us!

David Tindale, Whitby Computers Ltd, 8 Chubb Hill Road, Whitby, North Yorkshire YO21 1JU



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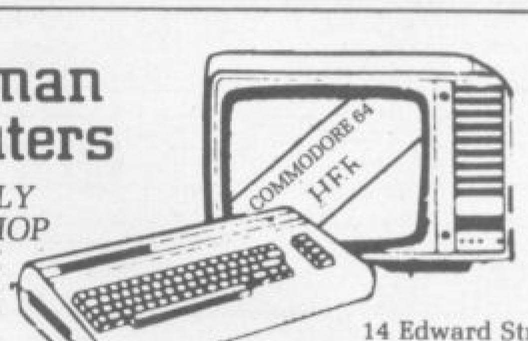
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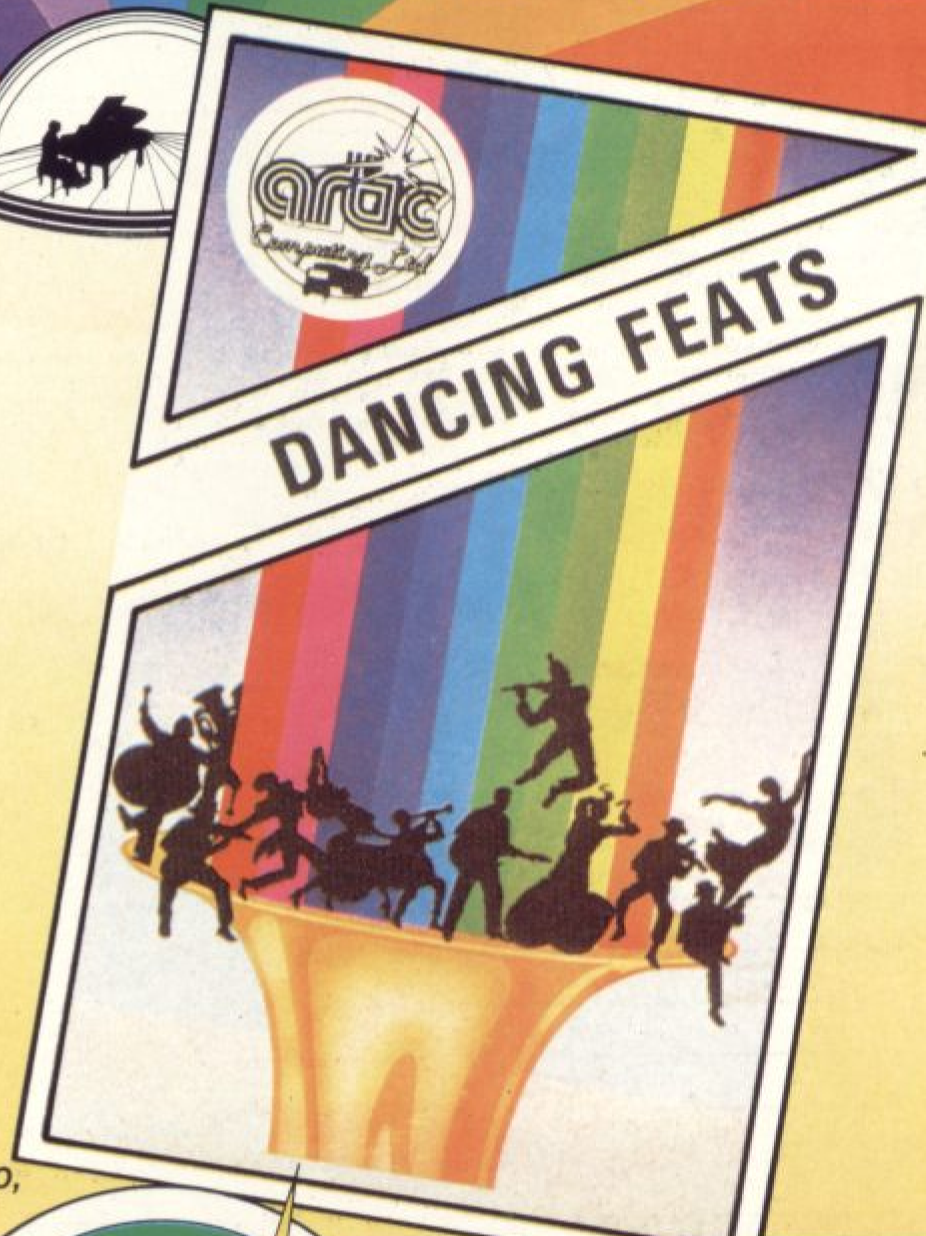
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